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FINANCIAL AND ECONOMIC REVIEW

June 2020
Vol. 19 Issue 2

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Financial and Economic Review

Scientific journal of the Magyar Nemzeti Bank

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Publisher: Magyar Nemzeti Bank

Publisher in Charge: ESZTER HERGÁR

H-1054 Budapest, Szabadság tér 9.

<http://english.hitelintezetiszemle.hu/>

ISSN 2415–9271 (Print)

ISSN 2415–928X (Online)

Cover design: MARIANNA IZSÓNÉ BIGAI

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The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.



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June 2020
Vol. 19 Issue 2



FINANCIAL AND ECONOMIC REVIEW

The address of the Editorial Office: H-1054 Budapest, Szabadság tér 9.

Phone: +36-1-428-2600

Fax: +36-1-429-8000

Homepage: <http://english.hitelintezetiszemle.hu/>

E-mail: szemle@hitelintezetiszemle.hu

Editorial Staff:

Barnabás Virág Editor-in-Chief, E-mail: viragb@mnb.hu

Endre Morvay Editor-in-Charge, E-mail: morvaye@mnb.hu

Published regularly every three months.

HU ISSN 2415–9271 (Print)

HU ISSN 2415–928X (Online)

Page setting and printing:

Prospektus Kft.

H-8200 Veszprém, Tartu u. 6.

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In Search of the Lost Balassa–Samuelson Effect – The Changing Role of Services in the 21st Century*

Veronika Tengely

It is a generally observed phenomenon that there is a positive relationship between the level of economic development and the general price level. According to the Balassa–Samuelson effect, the convergence observed in the price level is largely achieved through higher services inflation. Based on the update of our previous regression estimation results on the effect, the textbook Balassa–Samuelson effect can be detected less and less in the case of Hungary. Moreover, the phenomenon also shows a similar shift in the case of a wider group of countries. The structural transformation taking place in the world economy nowadays, globalisation and the infocommunication revolution are fundamentally transforming the role, tradability and productivity of services, which also influences the fulfilment of the assumptions of the theory. These factors – in particular with regard to market services – have been assessed in terms of several aspects: based on growth patterns, the role of the services sector in the growth path of modern economies is becoming increasingly important, which is proved by both international and domestic data. Current megatrends – such as globalisation, digitalisation, technological development and artificial intelligence – are accelerating the rising productivity of services and leading to changes in consumer habits and the globalisation of services. New structural shifts affecting the services sector are also transforming the conditions associated with the theory, thus weakening the practical operability of the Balassa–Samuelson effect.

Journal of Economic Literature (JEL) codes: E31, F15, F18, F43, F63, O10, O30

Keywords: services, inflation, Balassa–Samuelson effect, growth, megatrends, productivity

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

Veronika Tengely is an Economist at the Magyar Nemzeti Bank. Email: tengelyv@mnbb.hu

The Hungarian manuscript was received on 16 September 2019.

DOI: <http://doi.org/10.33893/FER.19.2.527>

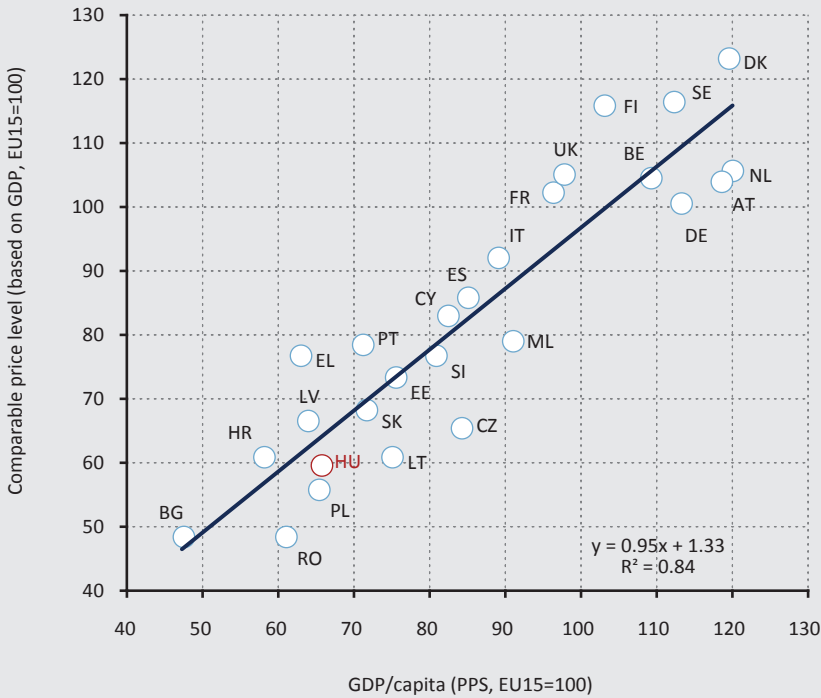
1. Introduction

It is a generally observed phenomenon that a positive relationship can be identified between the development of economies and the price level, with the result that the real convergence of countries leads to similar convergence in price developments as well. To understand the link between the development of individual economies and prices, it is worth thinking about the important relationships in international economics such as purchasing power parity. Based on the theory of purchasing power parity dating back to 1916, the relative price of consumer baskets expressed in consumer baskets of other countries is constant over time and has a value of 1 (*Cassel 1916*). In practice, however, the hypothesis of purchasing power parity fails, at least over the short term, i.e. the price of consumer baskets expressed in the same currency will not necessarily be the same across all countries. Studies on the subject, dating back to the 1970s (*Kravis et al. 1978, Rogoff 1996*), point out that these systematic differences may be smaller for higher-income ('richer') countries, while they may be larger for low-income countries.

Analysing the correlation between development and price level based on data for European Union countries, we can identify a strong positive relationship (*Figure 1*). In the comparison, we approximated the development to the level of GDP per capita on a purchasing power basis relative to the EU15. The EU15 was also the benchmark for comparable price levels, as these countries can be considered as the group of developed EU countries.¹ On the one hand, based on the 2018 data, the general observation according to the theory can be confirmed, which states that comparable price levels in developed countries are higher than in developing countries. On the other hand, the regression line indicates that development explains more than 80 per cent of the difference in price levels between countries.

¹ The group of EU15 countries includes countries that were already members of the European Union before 1 May 2004. These countries are: Austria, Belgium, Denmark, the United Kingdom, Finland, France, Greece, the Netherlands, Ireland, Luxembourg, Germany, Italy, Portugal, Spain, Sweden.

Figure 1
Comparable price levels as a function of economic development, 2018



Note: The figure does not show the outlier countries biasing the regression, Luxembourg and Ireland.

Source: Eurostat

Narrowing the focus of the study, in terms of the empirical literature dealing with the relationship between development and price level, we can highlight the studies that focus on Hungary and the countries of the Central and Eastern European region. Estimating the degree of price convergence associated with real convergence is addressed by *Égert et al. (2005)*, *Darvas and Szapáry (2008)* and *Bauer (2015)*. Regarding the average price convergence associated with a 1 per cent growth surplus, *Égert et al. (2005)* obtained as a result 0.8 per cent, *Darvas and Szapáry (2008)* 1.0 per cent, and *Bauer (2015)* found a range of 0.5–1.0 per cent.

The Balassa–Samuelson effect, which is of key importance for the study (hereinafter we refer to it as B–S effect too), is attributed to Béla Balassa and Paul Samuelson, who came to a similar conclusion independently in the early 1960s. The ‘main actors’ of the B–S effect are the well-distinguished traded and non-traded, i.e. industry and services sectors, the relationship of which and the factors shaping this relationship are examined in the first half of the study. According to the B–S effect (*Balassa 1964; Samuelson 1964*), there is an increase in productivity in industrial

goods being traded, which contributes to an increase in the wages in the sector. As the labour market of each sector within a given economy cannot be separated from each other, this wage increase spills over also to the services sector, thus contributing to the rise in the prices of – less productive – services. We also test the theory empirically for the European Union countries and then pay special attention to presenting the domestic and regional results within this group of countries. The aim of this part of our study is to test the Balassa–Samuelson effect on the data that have become available in the meantime, and to compare the results with the previous estimation results.

The second part of the study seeks to answer the question of which changes have significantly transformed the services sector and its role in the world's economies over the past 50 years. The recent structural transformation of economies, globalisation and the infocommunication revolution are causing changes in the role, tradability and productivity of services which, in our view, are changing the fulfilment of the necessary conditions for the Balassa–Samuelson effect (see *Section 2*). All of these aspects are explained in more detail in the individual sections and subsections. In this part of our study, the global approach comes to the fore, which directly or indirectly influences European – including regional and domestic – processes over the longer term.

The structure of the study is as follows: in *Part 2*, we analyse the Balassa–Samuelson effect and present the results of the related domestic studies. *Sections 3* and *4* analyse the factors that transform the role, productivity, and tradability of services, respectively. Finally, *Section 5* summarises our key conclusions.

2. The Balassa–Samuelson effect as a correlation explaining the relationship between price level and development

According to traditional economic thinking, the convergence observed in the price level is achieved through the inflation of services. As stated in the introduction, according to the Balassa–Samuelson effect, as the labour markets of the sectors within the countries are not completely independent of each other, wage growth in the industry spills over to the services sector, leading to higher prices for services. However, this process only takes place if certain assumptions are fulfilled.

The following assumptions traditionally form the basis for the Balassa–Samuelson effect (Bauer 2015:17):

- 1) ‘Emerging countries converge primarily through improvement in traded productivity, while non-traded productivity can be increased to a lesser degree. Take automobile manufacturing and hairdressing as examples: through the use of more advanced technologies, the productivity of automobile manufacturing – as a sector producing traded goods – can be improved significantly, while the productivity of hairdressing – a nontraded service – is likely to be very similar in developed and less developed countries.
- 2) Expressed in the same currency, traded prices are identical in all countries. The assumption is only valid if trade is completely free of charge and the quality of products is fully identical. If trade is costly (as it is in reality), the only thing that can be taken for granted is the co-movement of prices over the long run; for the B–S effect to take hold, however, even this is sufficient.
- 3) Wages are equalised between the traded and non-traded sectors. This concept is based on the assumption that the labour force can move freely between the two sectors (but not between countries). In reality, the two sectors may require different sets of skills, which may justify different wage levels. For the B–S effect to be valid, however, the long-term co-movement of wages is sufficient, which is a less restrictive assumption.’

2.1. The role of the Balassa–Samuelson effect in price level convergence in Hungary

After reviewing the assumptions associated with the theory, we focus on exploring the role of the Balassa–Samuelson effect in the convergence of the domestic price level, which we illustrate by presenting our estimation results. In his study, *Bauer (2015)* examines the B–S effect in Hungary and in the countries of the region in the period between 2001 and 2013, which we extended until 2018 in this study. The starting point for the dynamic analysis of the B–S effect is that, according to the two-sector neoclassical model, the relationship between prices and productivity in the industrial and the services sectors can be described with the following relationship by assuming perfect capital mobility and exogenous interest rates (*Obstfeld – Rogoff 1997:208*):

$$\Delta p^{NT} - \Delta p^T = \frac{\mu_L^{NT}}{\mu_L^T} (\Delta prod^T - \Delta prod^{NT}), \quad (1)$$

where Δp^{NT} denotes the inflation of services, Δp^T the inflation of industrial goods, $\Delta prod^T$ and $\Delta prod^{NT}$ the average productivity growth in the industrial and services sectors, and μ_L^{NT} and μ_L^T the sectoral share of labour in the services and industrial sectors, on the assumption that $\frac{\mu_L^{NT}}{\mu_L^T} \geq 1$. The variables are logarithmic differences, and Δ suggests that we will obtain percentage changes (growth rates) as a result.

The correlation can also be written to the average level of labour productivity, taking the advantage of the favourable feature of the Cobb–Douglas production function, according to which the marginal product of labour is equal to the average labour productivity.² In this case,

$$\frac{P^{NT}}{P^T} = \frac{\mu_L^T}{\mu_L^{NT}} \cdot \frac{\frac{Y^T}{L^T}}{\frac{Y^{NT}}{L^{NT}}}, \quad (2)$$

where P^{NT} and P^T denote the price levels of the services sector and industry, Y^T and Y^{NT} the level of output, L^T and L^{NT} denote the amount of labour used in each sector. Taking the logarithm of the above equation, we obtain the following formula:

$$p^{NT} - p^T = c + (prod^T - prod^{NT}), \quad (3)$$

where the constant c contains the logarithms of the sectoral shares.

In practice, there are several approaches to empirically estimate the inflation surplus due to the Balassa–Samuelson effect, one of which is the simple accounting framework. In this case, we assume that the surplus inflation of services compared to industrial goods is determined by the weight of services in the consumer basket, and thus the inflation surplus due to changes in productivity ($\Delta p^{B-S} = \Delta p^{NT} - \Delta p^T$) is as follows (Égert 2007:7):

$$\Delta p^{B-S} = (1 - \alpha)(\Delta prod^T - \Delta prod^{NT}), \quad (4)$$

where $(1 - \alpha)$ represents the weight of services in the consumer basket. A further condition is that any change in the productivity difference between the two sectors causes a proportional (β) change in the relative prices of services as well (Égert 2007:7):

$$p^{NT} - p^T = \beta (prod^T - prod^{NT}), \quad (5)$$

However, the real essence of the simple accounting framework is that the coefficient (β) is taken to be 1 according to the theoretical correlation. The estimated form of the above equations, which was used similarly to Bauer's (2015) estimate is:

$$\Delta p^{NT} - \Delta p^T = c + \beta (\Delta prod^T - \Delta prod^{NT}) + \varepsilon, \quad (6)$$

where c denotes the constant, β the coefficient of the difference in productivity growth and ε denotes the error term. For the estimation, we used the logarithmic differences of the variables, to which Δ refers. We examined industrial productivity for the manufacturing sector, and services productivity for the sectors of trade,

² For further derivation, see Égert et al. (2006).

transportation, hotels and catering, telecommunications, finance, real estate and professional services. By traded inflation, we mean the inflation of industrial goods, and non-traded inflation is understood as the inflation of market services. Inflation data are adjusted for changes in the VAT rate. To estimate the effect, we used average productivity growth and inflation for the period 2001–2018.³

The updated estimation results for the B–S effect are in line with the results of *Bauer (2015)*, i.e. *the correlation between the productivity growth differential and the inflation differential is weak*. At the same time, the evolution of the explanatory power (R^2 indicator) must be treated with due care in the case of including or omitting a constant term from the equation (*Table 1* and *Figure 2*). The reason for this is that in the case of omitting the constant term, we essentially should arrive at the theoretical relation, which would be supported by a coefficient of around 1. Omitting the constant from the regression, the explanatory power, i.e. the R^2 indicator calculated in the traditional sense, would be 0.71, suggesting a high fit. However, this is not confirmed in *Figure 2* (see the relationship between the dashed line and the data points). In the case of a regression without a constant, the R^2 indicator in the traditional sense can therefore be misleading because the conditions for its application are not met.⁴ The problem is solved by introducing an alternative interpretation of R^2 indicator (R^{*2}): in this case the correlation between the dependent variable ($\Delta p^{NT} - \Delta p^T$) and the estimated values of the dependent variable resulting from the regression ($\Delta \hat{p}^{NT} - \Delta \hat{p}^T$) is squared, and thus in our case we obtain an explanatory power of 0.19 (which is also shown in *Figure 2*), which is closer to reality.

As *Bauer (2015)* points out, and as also supported by the results obtained, in practice the value of the estimated coefficient of the sectoral productivity growth differential is generally less than 1 as justified by the theoretical relation. This problem can be bridged if we calculate using the simple accounting framework as described above. However, according to *Világi (2005)*, if we supplement the classical assumptions of the B–S-theory with sticky prices and the frictions of the allocation of resources, the models predict a coefficient much smaller than the theoretical coefficient of 1.

³ Comparable consumer price index data in the traded/non-traded composition which we used are only available from 2001 for all EU countries.

⁴ The condition for applying the R^2 index in the traditional sense in the case without a constant is that the average of the dependent variable (in this case the sectoral inflation difference) is zero with the value of explanatory variable(s) being zero, i.e. the average of the error term is zero.

Table 1

Estimates of the Balassa–Samuelson effect with and without a constant term

Dependent variable: Inflation difference between sectors

R ²	0.19	
	Coefficient	Standard error
Sectoral productivity growth difference	0.342*	0.148
Constant	2.406	0.375

Dependent variable: Inflation difference between sectors

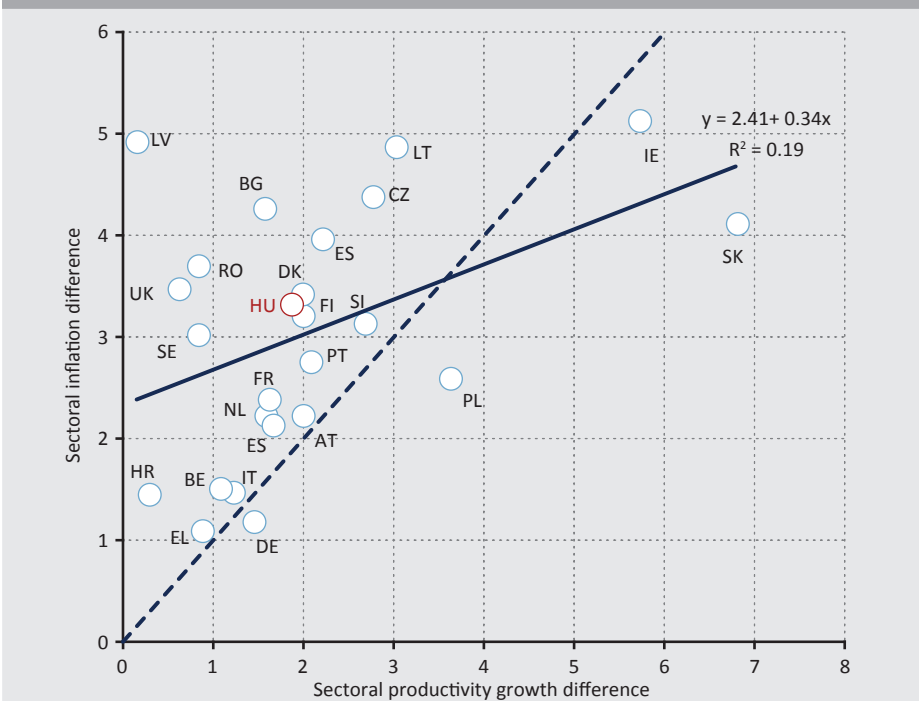
R* ²	0.19	
	Coefficient	Standard error
Sectoral productivity growth difference	1.108***	0.143

Note: Excluding Cyprus and Luxembourg. *** indicates coefficients significant at the 1 per cent level, while * indicates coefficients significant at the 10 per cent level. Estimation horizon: 2001–2018. In the case without a constant, an alternative definition of R² was used.

Source: Eurostat, estimate of the Magyar Nemzeti Bank (MNB)

Figure 2

Inflation differences between services and industrial goods relative to sectoral productivity growth differences in the industrial and services sectors

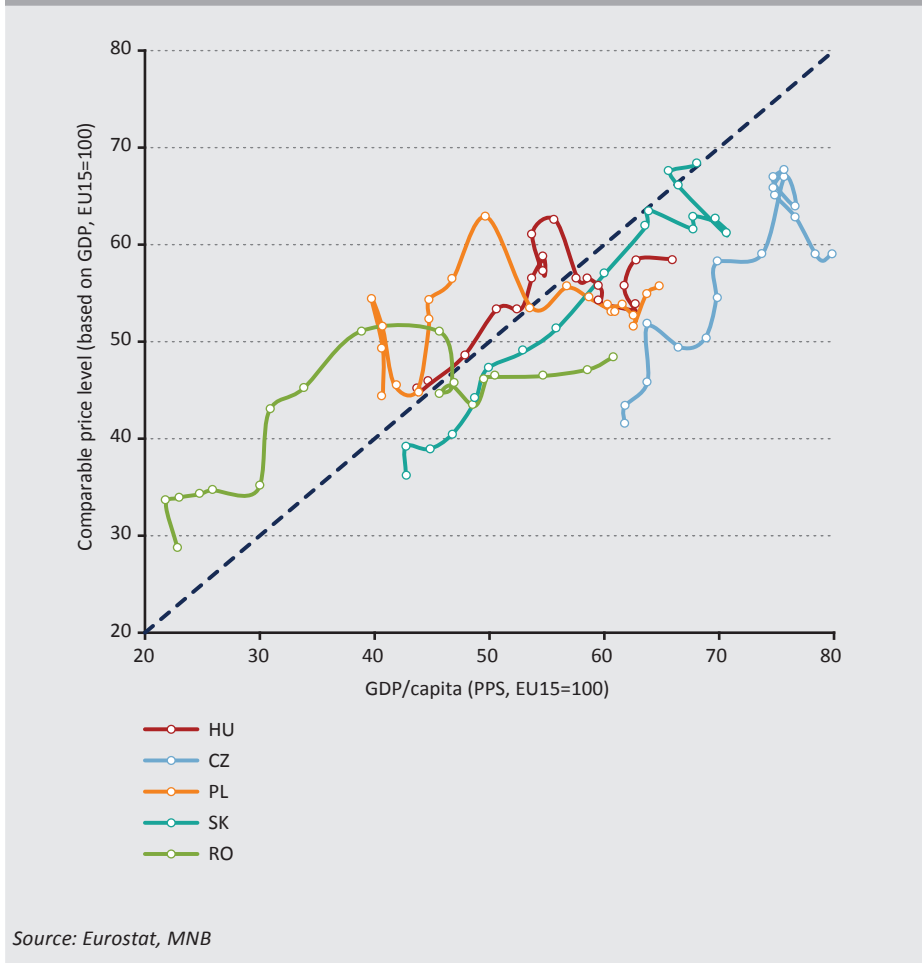


Note: Excluding Cyprus and Luxembourg. (2001–2018, annual growth differences in percentages).

Source: Eurostat, MNB

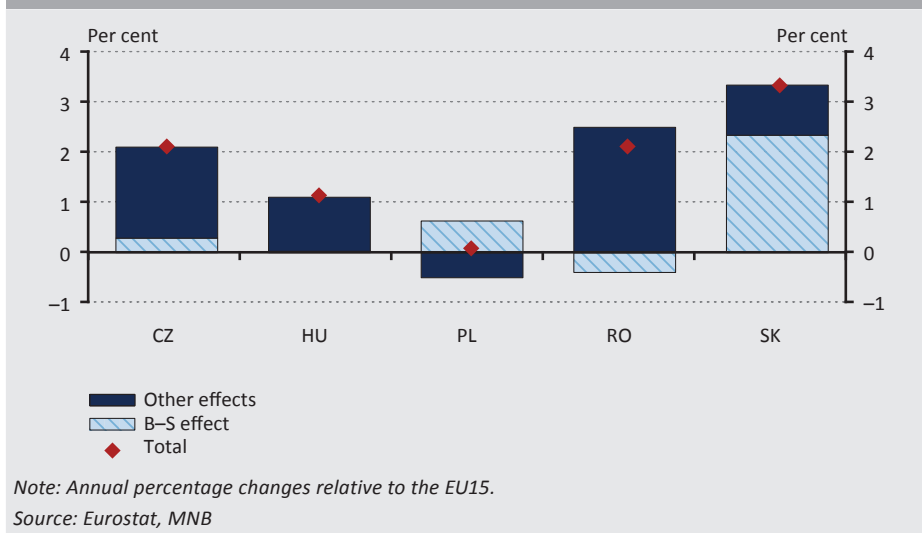
We also examined the development of price level convergence over the last nearly two decades in Hungary and in the other countries of the region (Figure 3). In line with economic convergence, we observed an increase in the relative price level up until the outbreak of the economic and financial crisis: after 2009 both real economic and price convergence slowed down somewhat.

Figure 3
Price convergence of Hungary and other CEE countries compared to the EU15 as a function of economic development (2001–2018)



Similar to *Bauer's (2015)* calculations, the annual average price convergence of the investigated period compared to the EU15 countries was decomposed according to the role of the B–S effect and other effects (Figure 4). Overall, the results show that the development–price level relationship, although it significantly contributed to the price convergence of the regional countries, is empirically less explained by the B–S effect if we focus on Hungary and the other regional countries in our study.

Figure 4
Role of the Balassa–Samuelson effect in price convergence (2001–2018)

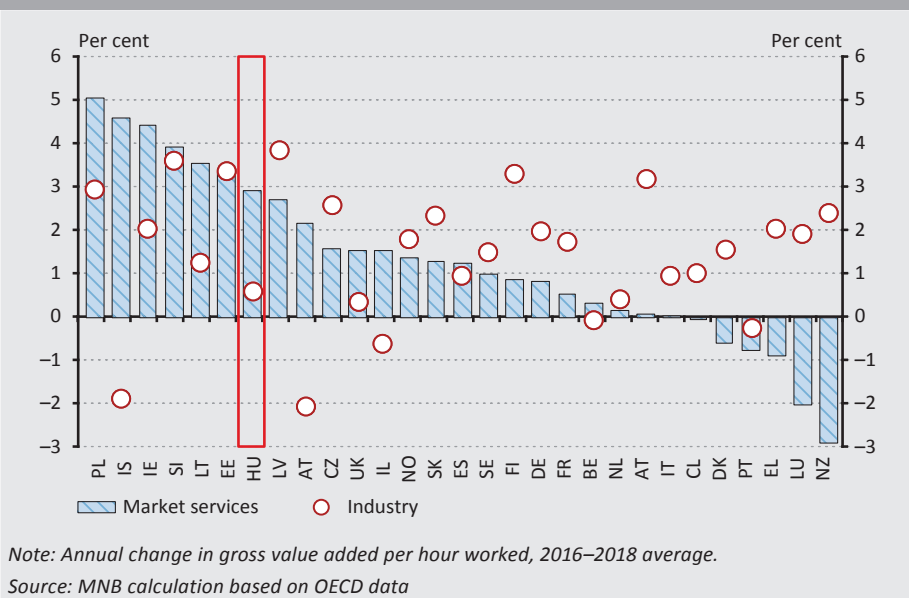


2.2. Evaluation of the estimation results of the Balassa–Samuelson effect

Based on the above, the estimation results, extended and updated with the data that have become available in the meantime, led to a conclusion similar to that of the previous estimates, as they only poorly supported the Balassa–Samuelson effect. The question arises as to what may be behind this. In order to answer this question, it is worth considering whether the traditional assumptions related to the theory still hold true nowadays or need to be supplemented or modified.

Over the past 50 years, the world's economies have undergone changes that have fundamentally transformed the services sector and its role, weakening the fulfilment of the necessary conditions for the Balassa–Samuelson effect. The first assumption is that the productivity of services can hardly be increased, which is no longer the case today and even more so in the future. Market services used to be characterised by historically subdued productivity growth compared to industry. However, based on data from the last few years, this may have changed, as proved also by the data: in the OECD countries, the productivity of market services has risen substantially in many countries, surpassing productivity growth in the industrial sector (*Figure 5*). Looking ahead, the new wave of innovation and the achievements of the new industrial revolution could further increase the productivity of services. In addition, if we adjust the measurement errors in the statistics on trade and value added in the services sector upwards (as will be discussed in more detail in the subsequent sections), we also conclude that the previous conclusion is no longer valid.

Figure 5
Recent changes in productivity in industry and the services sector



The statement on the free movement of labour between countries is also becoming increasingly invalid, the most obvious example being the free movement of labour within the European Union. Globalisation and the structural transformation of global value chains may have fundamentally changed the characteristics of services that are needed for the B–S effect to prevail: as services are increasingly integrated into produced goods, it is becoming increasingly difficult to separate industrial goods and services. However, statements about the non-tradability of services are also worth re-evaluating. These changes and the reasons behind the changes are discussed in detail in the following sections.

The Balassa–Samuelson effect is also clearly not confirmed by other research results in the literature. Some studies place the B–S effect in the European Union and in the countries of the Eurozone between 0 and 2 percentage points per year, e.g. *Mihaljek – Klau (2008)*, who carried out estimates regarding this in the period between 1996 Q1 and 2008 Q1 for 11 CEE countries. *Égert (2010)*, examining the 23 member states of the EU, estimates that this effect was below 2 percentage points per year between 1998 and 2007 and was closer to 0 in most cases. However, the estimation results are surrounded by uncertainty, which stems mainly from the sectoral classification and the measure of labour productivity.⁵

⁵ The measure of labour productivity is determined by the number of employees or the number of hours worked.

According to *Frensch and Schmillen (2011)*, no consensus can be found in the literature on the empirical justification of the B–S effect. The diverging results are primarily due to measurement errors, which are mainly related to the productivity measured in the tradable and non-tradable sectors, i.e. in the industrial goods and services sectors. The measurement error of productivity stems from two sources: on the one hand, total factor productivity should be used to measure sectoral productivity, the exact determination of which is uncertain. On the other hand, the literature dealing with the B–S effect defines traded and non-traded activities on an ad-hoc basis and assumes that tradability does not change over the period under investigation. In reality, however, the reduction in shipping costs allows more and more products to be traded. Measurement errors were supplemented by *Del Hoyo et al. (2017)* by adding that with the spread of global value chains, it is increasingly difficult to separate the tradable and non-tradable sectors, as services have become significantly more tradable in recent times and the results of the B–S effect are sensitive to the grouping of the two sectors.

3. New factors transforming the role and productivity of services

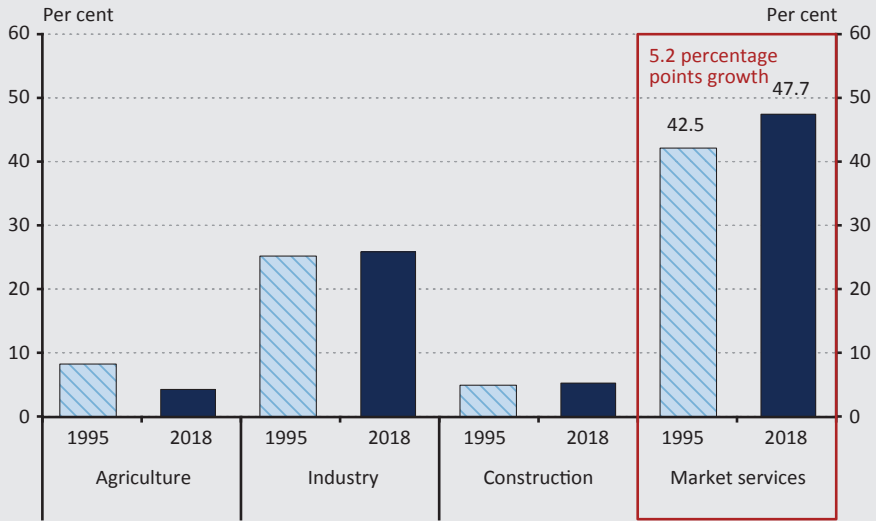
Structural changes in modern economies, the expansion of global value chains and technological innovations make the study of the Balassa–Samuelson effect and the effectiveness of its classical assumptions harder. These are the new factors that are transforming the role of services and are also affecting the productivity of the sector. In the course of the structural transformation taking place in parallel with economic development, the role of economic sectors in growth is gradually shifting. Changes in the industrial and services sectors are particularly significant, as their separability and relative productivity provide the basis for the Balassa–Samuelson theory and justify the inflation differential between the two sectors. Of today’s megatrends, globalisation of services and digitalisation support the reduction of prices in the most affected services groups, as they enable companies to reduce their costs and to also apply this in their prices. Technological developments and the accompanying innovations can contribute to rising productivity of the services sector, which again supports the reduction of prices and thus, the narrowing of the price differential between services and industrial goods. In the latter parts of this study, we tackle these processes in a more general approach and try to answer, but at least understand, why the traditional B–S effect may have weakened by the present day. In addition, we would like to highlight topics that may be of importance in understanding economic and pricing processes. Where possible, we also present the Hungarian aspects and results.

3.1. Sectoral rearrangement in the growth path of modern economies

Changes in the structure of production and employment between sectors are also confirmed by empirical studies carried out on long time series. *Large sectoral rearrangement is basically driven by two factors: on the one hand, productivity growth in individual sectors can differ significantly (supply-side effect), and on the other hand, the income elasticity of individual products and services is also different (demand-side effect) (Gabardo et al. 2017).* Using data dating back to the 19th century from 11 developed countries, a 2013 study by Herrendorf et al. examined how sectoral employment and value added ratios changed as a function of economic development. *In the initial stage of development, the agricultural sector is dominant – it accounts for the largest share of employment – but later the share of agriculture decreases significantly. By contrast, in the case of the industrial sector, the weight of the sector shows an inverted U-shape, i.e. the share within employment rises to a certain point of development and then decreases. The economic weight of services is constantly increasing in line with development.* In addition, an accelerating growth path can be detected at the point where industry has peaked in terms of the share of added value and employment within the examined time frame. The process is commonly referred to as the great structural reallocation and, following the pioneering work of Kuznets (1966), it became an important area of research in growth theory. The main reason for the changes is that, *at a low level of development, households essentially spend their income only on agricultural products. At the level of middle-development, the share of industrial products reaches 50 per cent, and then, at higher levels of development, services, although slowly growing but with high income elasticity, take priority over industrial products in final consumption.*

We examined whether similar patterns are seen in the Hungarian economy as well. Analysing the change in the weights of domestic economic value added, we can see that *the weight of agriculture has decreased, while the weight of industry and construction remained largely unchanged* in the last two decades (Figure 6). In the case of industry, we get a slightly different picture compared to global developments, which would represent a decrease in the economic weight of the sector. Stability is explained by the reallocation between sub-sectors of industry. While mining played a substantial role within industry in the 1990s, this role declined in the 2000s as automotive production gained an increasing share. As the two processes offset each other, the weight of industry was stable at around 25 per cent. *At the same time, the strengthening of the economic role of market services sector is confirmed by the fact that an increasing share of economic value added is produced by this sector.* By 2018, the share of market services in Hungarian GDP increased by 5.2 percentage points compared to 1995.

Figure 6
Changes in the value-added weights of domestic economic sectors

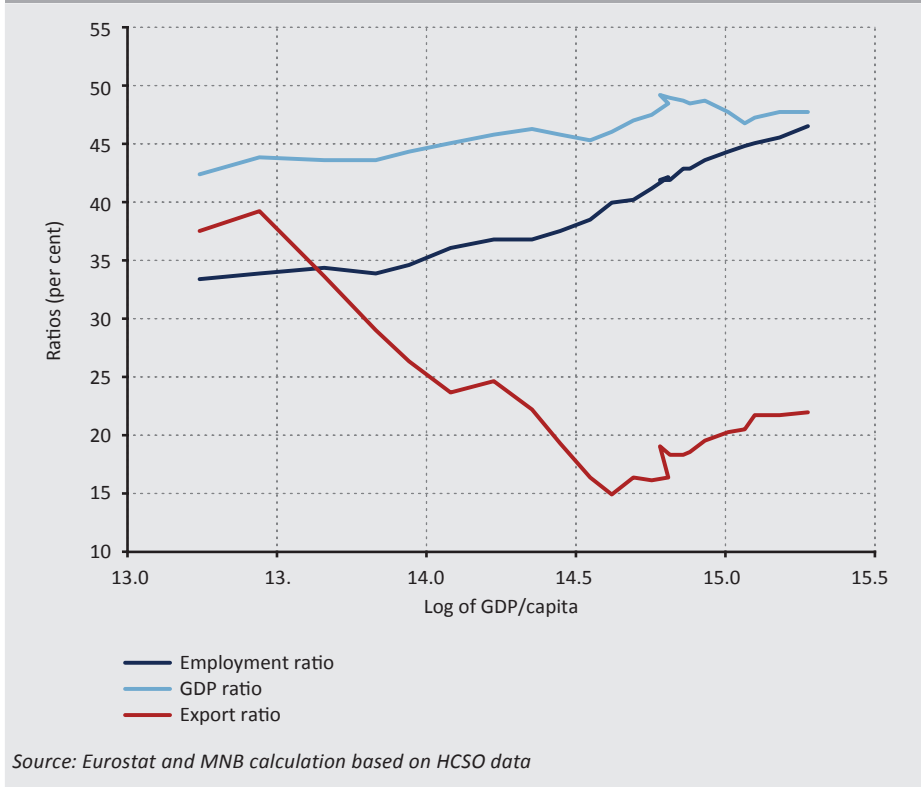


Note: Calculations based on GDP-data less taxes and subsidies.

Source: MNB calculation based on HCSO data

As the ‘winner’ of the structural transformation may be the services sector, in addition to the weight represented in the value added, we also analysed the services in relation to the various shares and development. Examining the *data of Hungary* for the period from 1995 to 2018, *the share of market-based services in employment increased year after year in parallel with development (Figure 7)*. The share of services within exports follows a similar pattern in the new growth cycle as well.

Figure 7
Different ratios of the services sector relative to economic development in Hungary (1995–2018)



3.2. New technologies have a significant impact on the productivity of services

In addition to the strengthening economic role of services, it is worth mentioning the changes brought about by new technologies, which can fundamentally impact the trade and productivity of services. Compared to the Balassa–Samuelson framework, these are definitely new developments that could not previously be taken into account when applying the assumptions.

In terms of the nature of change, we can classify technologies into three main groups (McKinsey 2019).

1) *The root of technologies reducing transaction costs lies in low-cost digital communications.* In some cases, this reduces not only transaction costs but also costs associated with logistics. A clear result of the reduction in costs is the expansion of the export of services, while it tends to curb trade in goods. Examples

of such technologies are the Internet of Things, automated document processing, self-driving cars, e-commerce, cloud services or blockchain.

2) *Central element of technologies altering economics of production is automation and, to some extent, artificial intelligence.* These technologies (such as robotic process automation or 3D printing) can help shorten the path between the production process and the consumer, thereby increasing trade in services compared to trade in goods. However, automation may replace certain workflows and jobs. Thus, for example, the emergence of virtual assistants counteracts the expansion of services exports, as the company no longer needs to outsource this service.

3) The last group comprises *technologies transforming existing products.* As a result of the process, new products are created that create previously unknown opportunities in terms of trade in goods and services. Telemedicine or various streaming services are good examples of such process. Looking ahead, high-speed 5G wireless networks could revolutionise the export of services.

As a result, we may experience a major increase in the productivity of the services sector in the following period, which contradicts assumption 1 of the B–S effect. However, it remains true that – according to the theory – the productivity differential compared to industry may decrease, leading to a similar change in the inflation differential.

4. Factors transforming the tradability of services

The globalisation of services is an important phenomenon in the world economy, driven by new megatrends and explanatory factors: the emergence of global value chains, new technologies, digitalisation, the platform economy, the declining costs of tourism and mobility, and a shift in attitudes and the appreciation of ‘me-time’. These changes may lead to an increasing degree of interconnection of services and industry, thus making the separation of the products and services of the two sectors more difficult. As a consequence, the uncertainty of the estimates aimed at examining the Balassa–Samuelson effect may increase, as the results are sensitive to the traded – non-traded grouping, as pointed out in the international literature on the subject. In addition, we can also expect the ‘non-tradability’ of services to ‘dissolve’, which is confirmed by (adjusted) data from trade statistics and the structural transformation of global value chains.

Studies dealing with the globalisation of services have recently appeared in the literature, including a study by the OECD (*Miroudot – Cadestin 2017*) and the World Bank (*Heuser – Mattoo 2017*). The phenomenon referred to in the literature as the servicification of the manufacturing industry, as defined by *Miroudot and*

Cadestin (2017), means that the manufacturing industry becomes increasingly dependent on services as they are integrated into the manufacturing process as input or linked to the end product (manufactured goods). This is also confirmed by the results of Lanz and Maurer (2015), who examined the share of value added of services in the export of industrial goods. According to their estimation results, the value added of services in developed countries accounts for nearly a third of industrial goods exports, while in developing countries this value is 26 per cent. Servicification, complemented by digitisation and the spread of new technologies, provides an opportunity for manufacturing companies to transform and expand their traditionally used value creation processes. This transformation is a consequence of today's typical consumer-orientation and a new generation of global value chains. In the new generation of value chains, companies aim to shorten the path between the product and the consumer in terms of time, while delivering to the consumer a product that best meets their (rapidly changing) needs. According to the results of Lanz and Maurer (2015), from the beginning of production to the final use, industrial goods go through an average of 4.45 production phases, while for services this figure is only 3.66. This means that services reach consumers much faster. Experience has shown that successful companies pay close attention to after-sale services, that is, post-purchase contact, as this ensures future purchases. Overall, new types of value chains are based much more on services than on traditional trade in goods.

Traditional value chains represent a series of activities and processes that enable a product to be delivered to the end user, i.e. the consumer by taking form from the level of an idea through design and implementation. In the past, this process took place within a given company or country, but globalisation has extended the value chains as well, and today, in the case of global value chains (GVCs), the different phases of production take place geographically fragmented, in different countries. Owing to this fragmentation, there is an opportunity to share knowledge, which increases the efficiency of global value chains and also contributes to added value. Both the World Bank and the OECD emphasise that GVCs encourage companies to take advantage of the elimination of geographical and trade barriers due to globalisation by reorganising production processes in the most beneficial and efficient way possible.

The development and dynamic expansion of global value chains was mainly observed in the early 2000s and during the crisis, and in the subsequent period, this growth rate stabilised or expanded only moderately. According to a study published by McKinsey in January 2019, there are currently five types of structural transformation taking place in global value chains:

- 1) The trade intensity of commodity value chains is declining: trade intensity, defined in the study as the ratio of gross exports to gross output, has declined in all*

commodity value chains in the recent period, but this does not mean that the role of globalisation is diminishing. The background of the process is that China and other developing countries are consuming an increasing share of the products they produce, thus reducing the amount that can be exported.

- 2) *Trade-based labour arbitrage is becoming less important*: today, more than 80 per cent of global trade in goods is no longer directed from a low-labour-cost country to a high-labour-cost country, reflecting the fact that this aspect has lost its former significance.
- 3) *Global value chains are moving from global to regional*: the shift towards regional value chains is most characteristic of innovation-based value chains. This is because proximity to consumers is crucial in these due to the 'just-in-time' system.
- 4) *Global value chains are becoming increasingly knowledge-intensive*.
- 5) *The role of services in GVCs is growing, its significance is, however, underestimated*.

From the point of view of our study, the last transformation impacting services (Item 5) is the most significant, and thus this is examined in more detail in *Subsection 4.1*.

4.1. The increasing role of services in GVCs

In terms of global trade, based on the available UNCTAD data,⁶ *global trade in goods grew by 4.4 per cent between 2007 and 2017, while the growth of trade in services was almost by one and a half times more (5.7 per cent)*. We get a more varied picture if we look at the growth rate of certain service groups in more detail. The highest growth, one and a half to two times higher than that for the trade in goods, occurred in telecommunications and IT (7.8 per cent), as well as business services (6.9 per cent) and intellectual property rights (7.3 per cent). This pattern is a good reflection of today's technological advances and the spread of digitalisation.

However, measuring services exports is challenged by a number of factors, and thus the question arises as to whether the role of services is correctly reflected in the available trade statistics. This is justified on the one hand by the fact that services account for an increasing share of the value of traded goods, and on the other hand, that the trade in intangible assets – software, brands, intellectual property, etc. – within companies or groups of companies is distorted in the statistics. Other reasons include the value created by free digital services and the fact that the former sharp line between services and goods is becoming increasingly blurred as goods and services are today sold bundled to one another (e.g. car sharing, bike

⁶ The figures presented in this paragraph were calculated on the basis of the UNCTAD Stat database on international trade in goods and services. The database is available at https://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx?sCS_ChosenLang=en

sharing or parking services). This makes it more difficult to measure the value added of the services and manufacturing sectors. Currently, statistics decide on the sectoral classification of economic activities on the basis of primary activity. Bundling and services provided by manufacturing companies, which – where applicable – serve as a significant source of revenue, may cause substantial bias in statistics (MNB 2017).

Based on 2017 data, the value added of services in global trade was USD 5.1 trillion (McKinsey 2019). However, the value added measured by statistics may be different when numerous other factors are taken into account. As a result of servicification, the estimated value added of services embedded in trade in goods is USD 4.3 trillion, which is more than 80 per cent of the value added of global service trade. Another adjustment item is the value added from intangible assets provided to foreign subsidiaries (USD 0.8 trillion). Various software, brands, operational processes, or certain design elements represent significant value within a company or a group of companies that cannot be properly priced until they are subject to intellectual property protection. However, this does not happen in many cases. Finally, foreign trade statistics are unable to assess even the value that free cross-border digital services create for their users (USD 3.2 trillion). Overall, all items that are presumably underestimated or not even measured by statistics would represent an extra USD 8.3 trillion value added in terms of services. Thus, the adjusted value added of services (USD 13.4 trillion) would slightly exceed the value added of trade in goods (USD 13.0 trillion) in global trade.

4.2. Impact of new megatrends on the tradability of services

Although the development of GVCs plays an important role in increasing the tradability of services and the interconnectedness of industry and the services sector, the role of new megatrends must also be taken into account in this process. The platform economy, the falling costs of tourism and mobility, and the change in approach based on the appreciation of ‘me-time’ also contribute to the transformation of the ‘traditional’ perception of the characteristics of services.

In the case of the platform economy, the Internet creates a multilateral digital framework that allows participants, i.e. demand and supply, to interact with one another. The effects of the platform economy are also commonly referred to as another wave of globalisation. For example, Amazon, Google, Facebook or Alibaba operate on a platform basis. The fact that many different types of transactions can be concluded on these digital platforms and, looking ahead, the barriers to traditional economic and market operation are practically eliminated in an economy or market functioning on digital basis significantly contributes to increasing the tradability of services.

In addition to the platform economy, the expansion of the experience-based economy is also impacting the tradability of services. In the experience-based

economy, 'me-time' is appreciating and there is a greater demand for the consumption of services. In this context, tourism and related services are of paramount importance. Today, consumer habits have changed, and for the younger generations (Y, Z, and Alpha) in particular, collecting experiences is much more important than possessing objects. Substantial reductions in mobility costs also play a role in the boom in tourism, with special regard to aviation. The attractive offers of low-cost airlines now make this form of travel accessible to a wider public, thus changing the way we used to think about services some decades ago, namely, that services are less tradable than industrial goods. Thus, nowadays, anyone can travel anywhere within a reasonable budget to get a service, be it for fun or even a dental treatment.

At the same time, it should be pointed out that the different national regulations of the individual countries sometimes put obstacles in the way of a further increase in trade in services. In this regard, *Heuser and Mattoo (2017)* assigned the difficulties arising from regulation into two groups: direct regulation and differences in regulation. In the former case, the specific legal or other regulation directly impedes the cross-border expansion of services. A good example for this is the case of telecommunications, as this sector is mostly a monopolistic or a relatively closed market. Regulatory differences between the countries mainly reduce the compatibility of goods and services, while contributing to increased transaction costs. Differences in regulation explain why GVCs have not (or only slowly) developed in sectors such as education or health.

5. Summary and conclusions

As noted in the introduction to the study, one generally observed phenomenon is that a positive relationship can be identified between the development of economies and the price level. Analysing the countries of the European Union, empirical facts confirmed the positive link between development and comparable price levels. Based on previous results, one of the reasons for this phenomenon may be the Balassa–Samuelson effect, according to which the convergence observed in the price level is achieved through the inflation of services. In our study, based on the estimation results we can conclude that the textbook B–S effect is less and less detectable – compared to previous results – in the case of the EU countries and, in a narrower sense, of Hungary, and is thus increasingly unlikely to be able to explain the process of price convergence. In our opinion, the background of the results is that the characteristics of the services and thus the basic assumptions of the theory have changed significantly. Accordingly, we paid special attention in the study to the analysis of the changed assumptions, in particular with regard to market services, and to the exploration of the underlying reasons. We also drew attention to new factors that may provide a different explanation for the price convergence process.

The structural transformation taking place in the economies today, globalisation and the infocommunication revolution are fundamentally transforming the role, tradability and productivity of services.

Based on *growth patterns*, the weight of agriculture decreases in parallel with economic development, while the weight of industry follows an inverted U-shape. At the same time, the role of the services sector in growth is increasing in the development path of modern economies. Patterns of global transformations can also be observed in the Hungarian trends, i.e. the share of market-based services in employment increases year by year in parallel with development. The strengthening of the economic role of market services sector is shown by the fact that an increasing share of economic added value is produced by this sector. By 2018, the share of market services in the Hungarian GDP increased from 42.5 per cent to 47.7 per cent compared to 1995.

We also assessed the new factors transforming the role and productivity of services. Here, we focused primarily on the effects of new technologies, as these could not yet be taken into account by the traditional Balassa–Samuelson theoretical framework. Technological developments and the accompanying innovations essentially contribute to increasing the productivity of the services sector.

In addition to accelerating the increase in the productivity of services, *current megatrends* – such as globalisation, digitalisation, technological development and artificial intelligence – are causing changes in consumer habits and the globalisation of services, which further weakens the practical operability of the B–S effect. Following the dynamic expansion of GVCs observed in the early 2000s, a number of structural transformations are currently taking place: the trade intensity of commodity-producing value chains is declining; with the development of robotics, labour arbitrage based on trade in goods is becoming less important; at the same time, global value chains are becoming much more knowledge-intensive and the role of services in global value chains is increasing. From among these, the last change is considered as the most important for our study. Although the development of global value chains plays an important role in increasing the tradability of services and the interconnectedness of industry and the services sector, the role of new megatrends must also be taken into account in this process. The platform economy, the falling costs of tourism and mobility, and the change in approach based on the appreciation of ‘me-time’ and the experience economy are also contributing to the transformation of the ‘traditional’ perception of the characteristics of services.

Last but not least, we noted that the value added of services is underestimated in the current National Accounts systems and in the trade statistics, some of which stem from measurement problems. *Adjustment items may include the estimated value added of services embedded in trade in goods as a result of servicification,*

the value added stemming from intangible assets provided to foreign subsidiaries, or the value created by free cross-border digital services for their users. Overall, all items that are presumably underestimated or not even measured by statistics would represent a substantial extra USD 8.3 trillion value added in terms of services. Thus, in global trade, the adjusted value added of services (USD 13.4 trillion) would slightly exceed the value added of trade in goods (USD 13.0 trillion).

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Government Debt Reduction in the Old EU Member States: Is This Time Different?*

Miklós Losoncz – Csaba G. Tóth

The international financial and economic crisis that started in 2007 and was referred to as the Great Recession, and the subsequent sovereign debt crisis, led to a significant increase in the government debt ratio (the ratio of gross government debt to GDP) in the European Union. This was followed by a gradual and lasting consolidation in the old EU Member States (EU15), which had last been seen from the mid-1990s onwards and which ended precisely because of the economic crisis. In our study, we use a debt decomposition analysis to show the main similarities and differences between the debt reduction period in the second half of the 2010s and the one that ended with the outbreak of the previous Great Recession. In both periods, the government debt ratio declined to a nearly similar extent on an annual average in almost two-thirds of the EU15 group of countries. However, in addition to this similarity, there were significant differences in the structure of consolidation. In the period from the mid-1990s to the 2007–2009 crisis, disciplined fiscal policy, in particular, stimulated debt reduction through the primary balance, the effect of real GDP growth was offset by the impact of real interest rates and the other items did not play a significant role. By contrast, the effect of fiscal policy has been much smaller in the debt reduction experienced over the past nearly half a decade, whereas the lower level of interest rates and the other items have contributed substantially to the consolidation process. The favourable international interest rate environment has made fiscal policy complacent. If monetary policy support is terminated or weakening, the role of fiscal policy in reducing the government debt ratio will become more important again to the EU15 states.

Journal of Economic Literature (JEL) codes: H63, H60, E62, E63

Keywords: fiscal policy, government debt, EU15, debt reduction, budget balance, consolidation

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

Miklós Losoncz (DSc) is Professor at the Faculty of Finance and Accountancy of Budapest Business School.

E-mail: losoncz.miklos@uni-bge.hu

Csaba G. Tóth (PhD) is Research Fellow at the Hungarian Demographic Research Institute of the Hungarian Central Statistical Office (HCSO). E-mail: toth@demografia.hu

This study was written with the support from the Office for Research Groups Attached to Universities and Other Institutions, through funding provided to the MTA-BGE Macroeconomic Sustainability Research Group. Prof. Miklós Losoncz is the leader of the research group.

The Hungarian manuscript was received on 16 March 2020.

DOI: <http://doi.org/10.33893/FER.19.2.2854>

1. Introduction¹

It is not without reason that the nearly one and a half decades that preceded the international financial and economic crisis² of 2007–2009 entered history books as the period of the *Great Moderation* (Bernanke 2004). Compared to previous years, the volatility of key macroeconomic indicators decreased significantly and, with a few exceptions, the management of the general government of EU Member States was also relatively calm. Although there were significant differences between individual countries, fiscal consolidations, which began in the 1990s and proved more or less effective in improving short-term imbalances, also led to halting and reversing the increase in gross government debt relative to GDP (Baldacci et al. 2014). However, the international financial and economic crisis, which marked the beginning of a new era in economic history, suddenly ended the carefree years of fiscal policy. This has forced economists and policy makers to reconsider their views on fiscal policy (Muraközy 2012). This was necessary, among other things, because within a few years the financial crisis and subsequent real economic crisis then triggered a sovereign debt crisis in several countries in the EU and the euro area, and even elsewhere. Governments of more than half a dozen states were forced to seek financial help from various international organisations to meet their payment obligations (Tóth 2014, Tóth 2017, Losonczi 2014). The significance of the problem we examine is indicated by the fact that even in its 2019 medium-term forecast (European Commission 2019), the European Commission found a medium or high risk to the sustainability of public finances in almost half of the EU Member States.³

It is thus understandable that – following the Great Recession and the ensuing sovereign debt crisis – most European states tried to consolidate their fiscal positions by gradually rectifying their imbalances and reducing their debt ratios. Due to significant differences in fiscal and cyclical positions, the turnaround did not occur simultaneously in all countries, but in 2015 the average debt ratio of the EU15 also started to decline, and since then the indicator has been falling year after year. This trend has been temporarily interrupted by the Covid-19 pandemic that appeared in early 2020 and then became global, or more precisely by the restrictions imposed to curb the pandemic and the adverse impact of government programmes on equilibria aimed at mitigating the economic downturn. Although the uncertainty about the expected, year-end debt ratios is enormous, according to the IMF (2020) forecast published in April, gross domestic product in the euro area may contract by 7.5 per cent in 2020. This suggests that 2019 most likely marked

¹ We thank the anonymous peer reviewers for their helpful suggestions.

² According to the official position, the recession in the US began in December 2007 and ended in June 2009, i.e. it lasted 18 months. According to the criteria of the International Monetary Fund, there was a global economy-wide recession in 2009.

³ For more information on fiscal sustainability, see the works of Burnside (2005), Castro – De Cos (2002), Agnello – Souza (2009), Presbitero (2011).

the end of the five-year period of fiscal consolidation and debt ratio reduction in EU15 states. In other words, the period that allowed for the expansion of fiscal leeway thanks to favourable cyclical conditions came to an end, and this leeway significantly determines each country's ability to deal with the pandemic and the associated economic crisis.

These processes can also be well demonstrated on the basis of specific numbers. In the old EU Member States (hereinafter referred to as EU15), the government debt ratio rose from 24 to 70 per cent between 1974 and 1996. Thereafter, the indicator decreased by almost 15 percentage points by the beginning of the crisis in 2007. As a result of the international financial and economic crisis of 2007–2009 and the ensuing sovereign debt crises, the EU15 government debt ratio rose again to an average of 92 per cent in 2014, before declining anew by almost 10 percentage points between 2015 and 2019. In other words, the debt reduction period that ended last year cannot be considered unprecedented.

However, the almost similar rate of decline in government debt during the two periods may be due to different developments. We examine these in our study, seeking answers to the following questions: To what extent are the two periods similar and different? What were the driving factors behind the debt reduction before the Great Recession? And which factors formed the basis for the consolidation carried out in the second half of the 2010s? Comparing the two periods is useful and instructive, not only to better understand the economic and social contexts behind the fiscal phenomena, but because past experiences can provide answers to our questions about current events as well. There has been a particularly intense debate among economic policy makers and economic professionals⁴ about the pace and effectiveness of recent debt reductions. Past experiences, in turn, can serve as guidance for the future, enriching our knowledge with new information and conclusions.

The *nature* of the study is an international comparative analysis based on statistical methods (decomposition of debt dynamics). The 15 old Member States of the European Union were included in the *comparison*. This is because, on the one hand, a sample of 15 countries is still relatively easy to handle. On the other hand, compliance with the public debt convergence criteria set out in the Maastricht Treaty (gross government debt not to exceed 60 per cent of GDP) and fulfilment of the enhanced provisions of the Stability and Growth Pact exerted significant external pressure on the economic policy and, within that, the fiscal policy of the Member States surveyed, particularly in the Economic and Monetary Union. Finally, the countries of Central, Eastern and Southern Europe, which joined the EU in 2004, 2007 and 2013, were excluded from the comparative analysis because in the

⁴ See the works of *La Torre – Marsiglio (2019)* and *Bouabdallah et al. (2017)*.

1990s most of them were struggling with the consequences of the transition to the market economy. This also left its mark on their fiscal policies and government debt positions. The scientific novelty of the paper lies in the fact that the recent debt reduction period was not analysed in isolation, as the characteristics and relationships behind the consolidation are analysed in comparison to an earlier period without major disturbances.

After the introduction, we review the possible types of debt reductions and then summarise how the government debt ratio developed in the EU15 group of countries in the analysed periods. Next, we present the stages and parameters of the debt decomposition analysis followed by a detailed presentation of the results. The final section contains the summary and conclusions.

2. Possible types of debt reductions

In addition to the redistribution and the allocation function, one of the most important tasks of the modern state is to promote economic stability (*Musgrave 1959*). As part of this, one of the most significant requirements for fiscal policy is to be able to provide fiscal stimulus in crisis situations (such as a demand shortage) (*Tóth 2010*), i.e. to make available external financial sources through the general government (*Alesina et al. 2008*). As this is mostly achieved through government borrowing, the traditional view is that fiscal stimuli are generally accompanied by an increase in government debt.

This view was refined by *De Grauwe – Ji (2019)*, who – based on the example of the EU15 – gave evidence supported by statistical data that in countries where the interest rate exceeds the GDP growth rate, the possibilities for fiscal expansion are limited due to the rise in the government debt ratio. However, where the interest rate is lower than GDP growth, the government debt ratio can be stabilised or reduced even with fiscal stimulus. Of course, the starting position, i.e. the initial value of the government debt ratio, is also significant: the higher it is, the more limited is the space for fiscal easing.

As a general trend, in order for the government to have enough fiscal space for indebtedness, if need be, it must be able to reduce the government debt ratio between crises, especially during economic recovery. On the one hand, this is necessary because if the government does not reduce the debt ratio in the recovery phase of the business cycle, then the so-called ratchet effect can easily occur (*P. Kiss 2012*). This means that if the debt ratio rises in crisis, whereas in non-crisis periods it simply does not go up further, then indebtedness will continue to mount in the long run due to crisis-related increases, threatening the sustainability of the general government (*Balatoni 2015, Tóth 2011*). However, in a dynamically growing economy, a tight or more responsible fiscal policy is needed with a gradual reduction

of the government debt ratio to create space for fiscal manoeuvre, even in the short term. Investor confidence gained in “peacetime” is an essential condition for meeting soaring financing needs in a crisis (*Ghosh et al. 2013*).

Lehmann et al (2020) also pointed out that the conditions for enforcing the convergence criteria set out in the Maastricht Treaty have recently become more difficult due to the decline in the rate of economic growth and inflation compared to the beginning of the 1990s. According to *Nagy et al (2020)*, to stabilise the 60 per cent government debt ratio, the general government deficit relative to GDP should be 1.1 per cent instead of 3 per cent. *Lehmann et al (2020)* also pointed out that EU fiscal rules ignore the equilibrium requirements between major national economy sectors (non-bank private sector, government and the rest of the world).

In countries with high government debt values, reducing the government debt ratio in the recovery phase of the business cycle is an overall objective, the realisation of which significantly reduces the vulnerability of public finances and improves the resilience of the economy to the effects of the next economic crisis. There are several different ways to reduce the debt ratio, and they can and should be categorised in several ways. Based on the economic policy approach of *Bernardini et al. (2019)*, we have created groups as follows:

i. Improvement in the primary balance. The academic literature generally refers to this channel as “orthodox fiscal adjustment” based on tax increases and expenditure restraints. The key question in this regard is how such a fiscal adjustment will affect economic growth and the level of interest rates and, through these two factors, the debt ratio itself. The general experience is that, in the short run, the rate of real GDP growth mostly declines due to the demand effect. However, the debt-increasing effect of this may be mitigated by fiscal discipline, which contributes to a moderation in nominal interest rates by strengthening investor confidence (*Alesina – Perotti 1995, Alesina – Perotti 1997*).

ii. Growth effect. Economic growth helps reduce debt through two channels. On the one hand, it lowers the debt ratio through the denominator effect. On the other hand, a booming economy generates more tax revenues, which also pushes down the debt ratio through the primary balance, if the additional revenues are not spent by the government but saved. From the point of view of measurement, however, it is often difficult to quantify the second effect. This would, namely, require accurate knowledge of the impact of economic growth on the budget balance, while filtering out the reverse effect. Although there was promising research on this (*Mauro – Zilinsky 2016*), when examining the change in the debt ratio, and thus when conducting the debt decomposition analyses as well, usually only the effect through the denominator is classified in this category.

- iii. *Acceleration of inflation.* According to mainstream economic theories, in today's practice, raising the money supply is less common but it is a theoretically possible way to monetise government debt. The financial theories of recent years (endogenous money creation) reject this approach. In this context, we refer to an increase in the inflation rate rather than in the money supply (because the latter does not necessarily induce the price level to rise). Growth in the price level through real interest rates in itself diminishes the debt ratio, but only if there is surprise inflation, and only to the extent that the given government relies on long-term, fixed-interest loans for financing (Aizenman – Marion 2009). Although to a lesser extent, an acceleration in the rate of inflation (or GDP deflator) may also help reduce the debt ratio through the denominator effect, because the larger the nominal GDP becomes, the smaller the quotient is (Hall – Sargent 2010).
- iv. *Decline in interest rates.* A decline in interest rates, both nominal and real, will reduce the debt ratio. In the former case, the interest expenditures constituting part of the annual current expenditures of government debt fall. One important tool for interest rate reduction is so-called financial repression (Reinhart – Rogoff 2009, Reinhart 2012). All legal and other administrative instruments aimed at cutting the interest rate level of government borrowing can be classified here. This may include the maximisation of deposit rates competing with government bonds enacted by the regulator, as well as the mandatory prescription to purchase a certain amount of government bonds for different insurance undertakings. In addition, the interest burden can also be reduced by restructuring government debt if a country succeeds in exchanging its government bonds for securities with lower interest rates or longer maturities. The last example in Europe was in Greece (Györfy 2014). A similar procedure is so-called mutualisation, which has been coined in the European Union typically, aiming to replace market loans with funds through the financing by EU institutions. These would raise funds from the market at a much lower rate than the market rates, due to the joint guarantee. The scheme was first a stopgap solution to manage the sovereign debt crisis. It was later put on the agenda in the context of further development of the Economic and Monetary Union with the aim of issuing government bonds jointly guaranteed by the Member States. Adoption of the proposal is unlikely, mainly due to Germany's opposition.
- v. *Privatisation.* One of the classic forms of debt reduction is the sale of state property. The key question in this respect is whether the state has assets that can be managed more efficiently in private ownership. The effectiveness and impact of privatisation measures depend largely on the price at which the transaction takes place. In most of the sample countries we analysed, this impact was negligible.

vi. *Exchange rate effect.* Government debt can also be lowered if the exchange rate of the domestic currency strengthens. The extent of this mainly depends on the amount of foreign currency liabilities within government debt. Through the exchange rate effect, not only the value of the debt can be mitigated, as annual nominal interest costs can also be lowered at the same time.

3. Evolution of government debt ratios

In this section, we present a detailed overview of the evolution of the government debt ratio of the EU15 countries in the period before the Great Recession and in the debt reduction period that ended in 2019. The first phase covers the period from 1997 to 2007 and the second one from 2015 to 2019 (*Figure 1*). In both cases, the first and last year of the decline in the average debt ratio constitute the time frame. For each country, the beginning and end of the debt reduction periods may also vary related to each phase. As the average government debt ratio rose between 2008 and 2014, we did not cover this, except of those countries where the second debt reduction period started in these years. Thus, during the analysis of each countries the first period is the period before the global financial crisis, while the second period is the 2010s.

To ensure the comparability of the data, we used the European Commission's AMECO database, both for the descriptive statistics and the subsequent analysis of debt dynamics. Most of the data series are available from 1995 and the last year taken into account in the calculations is 2019. As actual data for 2019 were not yet published at the time of writing the study, we used the latest EU forecast⁵ available for download from the AMECO database.⁶

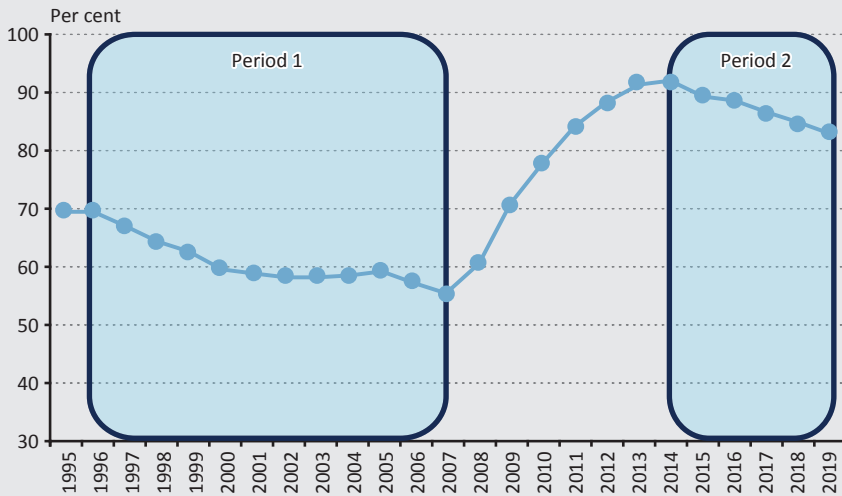
In terms of government debt relative to GDP, between 1997 and 2019, the two debt reduction periods are separated by a dynamic phase of increase in the debt ratio. In the mid-1990s, the average government debt ratio in the country group was 70 per cent, which fell from that level to 56 per cent by 2007. During this period, there were four countries (Greece, France, Germany and Portugal) with increasing government debt ratios. However, the increase typically did not exceed 10 percentage points even in these states. By contrast, between 1997 and 2007, for example, government debt relative to GDP fell by 46 percentage points in Ireland, 41 percentage points in Belgium and 30 percentage points in both the Netherlands and Sweden.

⁵ As for Denmark, AMECO contains data on debt only from 2000 onwards, and Danish data were not taken into account for longer data series aggregated at country group level. However, the debt decomposition analysis was, of course, also performed for Denmark in the shorter time series.

⁶ Date of downloading the data: 9 October 2019

As a consequence of the international financial and economic crisis and the resulting sovereign debt crisis in the euro area, the EU15 government debt ratio rose to 92 per cent by the end of 2014 and fell from there to 83 per cent at the end of 2019, according to the European Commission's forecast. During this period, the debt ratio only rose in France and Italy, but by only a few percentage points. At the same time, government debt relative to GDP decreased by 43 percentage points in Ireland, 19 percentage points in the Netherlands and 17 percentage points in Germany between 2015 and 2019.

Figure 1
Average government debt of the EU15 as a percentage of GDP



Source: AMECO

Although there are many similarities in the dynamics of the debt ratio between the countries reviewed, the differences in the level of the indicator are significant throughout the period (as well). In the first period, the government debt ratio was exceptionally high in three countries – Belgium, Italy and Greece – where it exceeded 100 per cent of GDP. As a result of the crisis, the Greek debt ratio jumped quickly above 160 per cent and the Italian and Portuguese indicators to 130 per cent. At the other end of the scale, on the one hand, it is worth highlighting Luxembourg, where the government debt ratio was below 25 per cent all along, and on the other hand Sweden, which was closest to it, where the value of the indicator was still around 70 per cent in the mid-1990s, which in turn has fallen below 40 per cent in recent years.

Giving a bird's eye view summary of the most important characteristics of the two debt reduction periods for the whole group of countries, it can be stated

that whereas in the first period of 1997–2007 the average government debt ratio dropped by around 1 percentage point on average per year, starting from an average of around 70 per cent, in the second period of 2015–2019 it declined from more than 90 per cent by nearly two percentage points per annum. In the next section, we analyse the components of this.

4. Debt decomposition analysis

4.1. The roadmap of decomposition

For decades, there has been a very significant emphasis in the academic literature on identifying the factors influencing changes in government debt and on accurately quantifying each effect. Although there has been continuous innovations in terms of methodology (see *Mauro – Zilinsky 2016*), it has been true for a relatively long time that most analyses try to estimate the effects using either a VAR model (*Hasko 2007, Cherif – Hasanov 2010, Ábel – Kóbor 2011*), or perform the decomposition with a so-called debt dynamics analysis (*P. Kiss 1999, De Bolle et al. 2006, Hall – Sargent 2010*).

The advantage of the former method is that in quantifying each effect, it is possible to control for all other factors (balance, interest rate, economic growth), and we are free to choose which factors we want to analyse in terms of their effects. It is important to emphasise that this is an estimation procedure that in itself carries considerable uncertainty. A reliable estimate would require a long time series, which is often not available.

The debt dynamics analysis we use below is based on accounting equivalences and is reproducible because neither the length of the period under review nor other circumstances affect the results. In the following, we deduce the decomposition of changes in the debt ratio, based on the works of *Ra – Rhee (2005)* and *Escolano (2010)*.

In the debt dynamics analysis, we used the assumption that the development of nominal government debt is influenced by the nominal interest rate and the primary balance. All other factors (such as the effect of exchange rate changes) can be classified in the category of other items. In contrast to inflation, both the nominal and the real interest rate are forward-looking, i.e. the debt (change) in period t depends (also) on the interest rate in period $t-1$:

$$B_t = (1 + i_{t-1})B_{t-1} - PB_t + SFA_t, \quad (1)$$

where B_t is the nominal government debt in period t , i_{t-1} is the nominal interest rate of the previous year, PB_t is the primary balance and SFA_t is the other item (stock-flow adjustment). As government debt is typically defined as a percentage of gross domestic product, we divide both sides by the GDP in period t (Y_t):

$$\frac{B_t}{Y_t} = \frac{(1 + i_{t-1})B_{t-1}}{Y_t} - \frac{PB_t}{Y_t} + \frac{SFA_t}{Y_t} \quad (2)$$

and we express Y_t by means of Y_{t-1} :

$$\frac{B_t}{Y_t} = \frac{(1 + i_{t-1})B_{t-1}}{(1 + g_t)(1 + \pi_t)Y_{t-1}} - \frac{PB_t}{Y_t} + \frac{SFA_t}{Y_t}, \quad (3)$$

where real growth is g_t and inflation is π_t .

Indicators relative to GDP are denoted in lower-case letters. Accordingly, the government debt is b_t , the primary balance is pb_t and the other item is sfa_t .

$$c = \frac{(1 + i_{t-1})}{(1 + g_t)(1 + \pi_t)} b_{t-1} - pb_t + sfa_t \quad (4)$$

In the next step, we subtract the $t-1^{th}$ periodic debt ratio from both sides of the equation and obtain the change in the debt ratio:

$$\Delta b_t = \frac{(1 + i_{t-1})}{(1 + g_t)(1 + \pi_t)} b_{t-1} - b_{t-1} - pb_t + sfa_t \quad (5)$$

$$\Delta b_t = \left[\frac{(1 + i_{t-1})}{(1 + g_t)(1 + \pi_t)} - 1 \right] b_{t-1} - pb_t + sfa_t \quad (6)$$

$$\Delta b_t = \left[\frac{(1 + i_{t-1})}{(1 + g_t)(1 + \pi_t)} - \frac{(1 + g_t)(1 + \pi_t)}{(1 + g_t)(1 + \pi_t)} \right] b_{t-1} - pb_t + sfa_t \quad (7)$$

$$\Delta b_t = \left[\frac{(1 + i_{t-1}) - (1 + g_t)(1 + \pi_t)}{(1 + g_t)(1 + \pi_t)} \right] b_{t-1} - pb_t + sfa_t \quad (8)$$

$$\Delta b_t = \left[\frac{i_{t-1} - g_t - \pi_t - g_t \pi_t}{(1 + g_t)(1 + \pi_t)} \right] b_{t-1} - pb_t + sfa_t \quad (9)$$

$$\Delta b_t = \left(\frac{-g_t}{(1 + g_t)(1 + \pi_t)} \right) b_{t-1} + \left(\frac{i_{t-1}}{(1 + g_t)(1 + \pi_t)} \right) b_{t-1} + \left(\frac{-\pi_t}{(1 + \pi_t)} \right) b_{t-1} - pb_t + sfa_t \quad (10)$$

On the right side of equation (10), we can find the decomposition of the change in the debt ratio for the following items in the order listed below:

- real GDP growth,
- nominal interest rate,
- inflation rate,
- primary budget balance,
- other items (privatisation, exchange rate, etc.)

In order to be able to interpret the results properly, it is worth drawing attention to a few more things. On the one hand, if we add the positive effect of the nominal interest rate and the negative effect of inflation, we get the effect of the real interest rate. This is important because the *dynamic component*, or as it is otherwise called, the *snowball effect*, which is the combined effect of the real interest rate and real GDP growth, plays a prominent role in the academic literature. The dynamic component is important because its sign determines whether the primary balance should show a surplus to stabilise the debt ratio, if the sum of the other effects is assumed to be zero. In addition, the difference between real GDP growth and the real interest rate is very often used to measure the sustainability of debt dynamics (Mellár 2002).

It can also be added to the interpretation of equation (10) that – since this is a method based on static accounting equivalences – the effect of the primary balance includes the improvement in the balance due to the acceleration of real GDP growth and the deterioration due to the slowdown or absence of real GDP growth. As to the growth effect, it includes the effects of fiscal demand stimulus and demand contraction. In other words, this method can only measure direct effects: on the one hand, the extent to which the government increases or decreases the debt by a primary deficit or by a primary surplus from year to year, and on the other hand, how real GDP growth affects the debt ratio through the denominator. Other effects are calculated in accordance with international practice covered by the academic literature. This comprises the effects of all factors that are not included in the others (privatisation, exchange rate effect, etc.).

4.2. The parameters of the debt decomposition analysis

The objective of the debt dynamics analysis is to identify, based on the presented methodology, which of the listed factors has influenced the development of the government debt ratio, and to what extent. We did not cover the whole period and all the countries, but only the years and countries when and where the government debt ratio declined. This means that we defined a pre-crisis and a post-crisis debt reduction period, if any, for each country. These debt reduction periods had to meet the following conditions:

- Government debt relative to GDP has been shrinking steadily for at least three years.
- During the debt reduction period, the government debt ratio declines by at least 0.5 per cent of GDP on average per year.
- During the debt reduction period, the government debt relative to GDP has fallen by at least 3 percentage points.
- In the debt reduction period, there are at most two years when the debt ratio does not decrease, but even then, the rise in the indicator is no greater than 20 per cent of the contraction that has occurred throughout the period.

In the first period, 11 of the 15 old EU Member States had a debt reduction phase meeting the above conditions. Of the countries under survey, only Greece, Austria, Germany and Luxembourg did not meet these criteria.

Table 1
Debt reduction intervals before the global financial crisis

	Initial debt ratio	Closing debt ratio	Change in debt ratio	First year	Last year	Number of years	Annual change in debt ratio
	(GDP %)	(GDP %)	(GDP %)				(GDP %)
Belgium	128.0	87.0	-40.9	1997	2007	11	-3.7
Denmark	49.1	27.3	-21.7	2003	2007	5	-4.3
Ireland	69.9	23.6	-46.2	1997	2006	10	-4.6
Spain	65.6	35.6	-30.0	1997	2007	11	-2.7
France	61.4	58.3	-3.1	1998	2001	4	-0.8
Italy	116.3	99.8	-16.5	1997	2007	11	-1.5
Netherlands	70.7	43.0	-27.7	1997	2007	11	-2.5
Portugal	59.5	50.3	-9.2	1997	2000	4	-2.3
Finland	56.1	32.7	-23.5	1995	2007	13	-1.8
Sweden	70.2	37.7	-32.4	1997	2008	12	-2.7
United Kingdom	44.7	34.3	-10.4	1996	2001	6	-1.7
AVERAGE	72.0	48.2	-23.8	1997	2005	9	-2.6

Source: Based on AMECO data

There were significant differences in all dimensions between debt reduction periods in terms of both time sequencing and the extent of debt reduction (*Table 1*). At the beginning of the 11 debt reduction periods of the 11 countries included in the analysis, the average government debt ratio was 72.0 per cent, which fell by 23.8 percentage points to 48.2 per cent on average by the end of the period. The largest debt ratio reduction amounted to almost 50 percentage points in Ireland, but it also exceeded 40 percentage points in Belgium, whereas the smallest reduction totalling 3.1 percentage points took place in France.

Debt reduction started typically before 1998. The only exception was Denmark, where it commenced in 2003. Debt reduction typically ended with the introduction of the euro beginning in 1998 and with the outbreak of the global financial and economic crisis. Prior to the introduction of the euro, the countries concerned met the convergence requirement for government debt. After the implementation of the Economic and Monetary Union, however, this pressure temporarily eased. The government debt reduction period was the longest in Finland, at 13 years, and the shortest in Portugal and France, at 4 years, while the average was 9 years.

In terms of the size of debt reduction per year, Ireland and Denmark were in first place with 4.6 and 4.3 percentage points, respectively, followed by France at the back of the ranking with 0.8 percentage points (*Table 1*). In the 11 years of the first period, government debt relative to GDP contracted by an average of 2.6 percentage points annually.

In the second period, ten countries had a debt reduction period meeting the conditions outlined above. Italy, France, Greece, Luxembourg and the United Kingdom were the exceptions (*Table 2*). In the starting year, the average debt ratio was 84.8 per cent, which fell by 16.6 percentage points to 68.1 per cent. The best performer was Ireland with 58.6 percentage points, Germany was second in the ranking with 23.4 percentage points, whereas the smallest debt ratio reduction of 4.1 percentage points took place in Spain.

	Initial debt ratio	Closing debt ratio	Change in debt ratio	First year	Last year	Number of years	Annual change in debt ratio
	(GDP %)	(GDP %)	(GDP %)				(GDP %)
Belgium	107.5	101.3	-6.2	2015	2019	5	-1.2
Denmark	46.1	33.0	-13.1	2012	2019	8	-1.6
Germany	81.8	58.4	-23.4	2011	2019	9	-2.6
Ireland	119.9	61.3	-58.6	2013	2019	7	-8.4
Spain	100.4	96.3	-4.1	2015	2019	5	-0.8
Netherlands	67.9	49.1	-18.8	2015	2019	5	-3.8
Austria	84.7	69.7	-15.0	2016	2019	4	-3.8
Portugal	130.6	119.5	-11.1	2015	2019	5	-2.2
Finland	63.4	58.3	-5.1	2016	2019	4	-1.3
Sweden	45.5	34.4	-11.1	2015	2019	5	-2.2
AVERAGE	84.8	68.1	-16.6	2014	2019	6	-2.8

Source: Based on AMECO data

Post-crisis debt reduction typically started around 2015, but commenced as early as 2011 in Germany, while it only began in 2016 in Finland and Austria. The last year analysed is 2019, not only because the current figures for this year are likely to no longer deviate substantially from the final values, but because Covid-19 pandemic will terminate this consolidation period as well. Accordingly, the average length of the debt reduction periods was 6 years. Ireland also leads in the one-year debt reduction with 8.4 percentage points, followed well behind by the Netherlands and Austria with 3.8 percentage points each, whereas Spain finds itself at the back of the

ranking with 0.8 percentage points. The average annual debt reduction for the entire second period and all debt reduction intervals until 2019 was 2.8 per cent of GDP.

Summarising the above, the most important *similarity between the two periods* is that, on the one hand, in both periods the same number of countries (on the order of 10–11) had debt reduction intervals, and on the other hand, the rate of average annual debt ratio decline was also similar (2.6 and 2.8 percentage points, respectively).

There was no significant difference in the *initial level of debt ratios*, which averaged 72 per cent in the first period and 85 per cent in the second one. However, at the end of the debt reduction periods, the difference was greater. In light of the similar pace of debt reduction, this can be attributed to the different lengths of the two periods analysed (9 and 6 years, respectively).

5. Results

5.1. Average effects

In the following, we first provide details as to what extent the listed factors by country contributed to debt reduction separately in the two periods analysed, and then we compare the two periods on the basis of the relative contribution of each factor.

With respect to the first period, it can be generally stated that the driving force in debt reduction was exclusively fiscal policy and, within that, *fiscal discipline* (Table 3). Namely, the average debt reduction effect of the primary balance (29.5 percentage points) exceeded the average debt reduction rate (23.8 percentage points). This also holds true for almost two-thirds of the countries individually, but is particularly valid for Finland, where the debt-reducing effect of the primary balance was almost three times the debt ratio decline. Portugal was the only country where the primary deficit raised the debt level even during the debt reduction period. In the other countries analysed, fiscal policy not only helped to reduce liabilities but led the way in this process as well.

Table 3**Decomposition of the change in debt ratio as a percentage of GDP before the global financial crisis**

	Change in debt	Primary balance	Real GDP growth	Inflation	Nominal interest rate	Other items	Snowball	Real interest rate
		(1)	(2)	(3)	(4)	(5)	(2)+(3)+(4)	(3)+(4)
Belgium	-40.9	-55.8	-29.0	-21.3	68.0	-2.8	17.7	46.7
Denmark	-21.7	-27.6	-4.0	-3.5	10.4	3.1	2.8	6.9
Ireland	-46.2	-36.6	-29.1	-12.3	15.0	16.7	-26.3	2.7
Spain	-30.0	-24.6	-21.6	-16.4	29.0	3.6	-9.0	12.7
Italy	-16.5	-31.8	-17.4	-25.1	63.9	-6.1	21.4	38.8
Netherlands	-27.7	-22.6	-17.4	-12.7	31.9	-6.9	1.8	19.2
Portugal	-9.2	1.4	-8.6	-5.3	12.5	-9.1	-1.5	7.1
Finland	-23.5	-64.3	-23.2	-9.3	35.0	38.3	2.6	25.8
Sweden	-32.4	-44.0	-20.0	-7.7	32.9	6.4	5.2	25.2
United Kingdom	-10.4	-12.5	-7.8	-4.7	17.1	-2.4	4.5	12.4
France	-3.1	-5.7	-7.5	-2.7	13.2	-0.5	3.0	10.5
AVERAGE	-23.8	-29.5	-16.9	-11.0	29.9	3.6	2.0	18.9

Source: Calculations based on AMECO data

Unlike disciplined fiscal policy, the *snowball effect* did not make a substantial contribution to reducing the debt ratio. Regarding the average trends, the debt-reducing effect of real GDP growth was just offset by the effect of the real interest rate. In this respect, however, there are larger differences between the individual countries. The snowball effect increased the debt ratio in Italy and Belgium by nearly 20 percentage points due to high interest rates, while it reduced it by nearly 10 percentage points in Spain and by nearly 30 percentage points in Ireland. It is true for both of the latter countries that the debt-reducing effect of *economic growth* surpassed the average, whereas the debt-increasing effect of the real interest rate fell short of it. Like the snowball effect, *the other items* did not substantially affect the debt ratio on average for the countries analysed. Finland and Ireland can be mentioned as exceptions, where the government debt ratio rose by 38 and 17 percentage points, respectively.

As the debt reduction period in each country was different in length, it is also worth examining the decomposition per annum (*Table 4*). This shows that *fiscal policy* supported the debt ratio decline – by more than 5 percentage points per year – in Belgium and Denmark, whereas in Portugal the rate of reduction was 0.2 percentage

points annually. In the case of Ireland and Belgium, which are at the forefront of *real GDP growth*, the contribution of economic growth was 2.5–3 percentage points per year, whereas in Denmark it was only 0.8 percentage points. The *real interest rate* lifted government debt relative to GDP by only 0.3 percentage points per annum in Ireland, compared to 4.2 percentage points in Belgium. The *other items* raised the debt ratio by almost 3 percentage points per year in Finland and 1.7 percentage points per year in Ireland, whereas they reduced it by more than 2 percentage points in Portugal.

Table 4
Decomposition of the change in debt ratio on an annual average basis, as a percentage of GDP, before the global financial crisis

	Change in debt	Primary balance	Real GDP growth	Inflation	Nominal interest rate	Other items	Snowball	Real interest rate
		(1)	(2)	(3)	(4)	(5)	(2)+(3)+(4)	(3)+(4)
Belgium	-3.7	-5.1	-2.6	-1.9	6.2	-0.3	1.6	4.2
Denmark	-4.3	-5.5	-0.8	-0.7	2.1	0.6	0.6	1.4
Ireland	-4.6	-3.7	-2.9	-1.2	1.5	1.7	-2.6	0.3
Spain	-2.7	-2.2	-2.0	-1.5	2.6	0.3	-0.8	1.2
Italy	-1.5	-2.9	-1.6	-2.3	5.8	-0.6	1.9	3.5
Netherlands	-2.5	-2.1	-1.6	-1.2	2.9	-0.6	0.2	1.7
Portugal	-2.3	0.4	-2.2	-1.3	3.1	-2.3	-0.4	1.8
Finland	-1.8	-4.9	-1.8	-0.7	2.7	2.9	0.2	2.0
Sweden	-2.7	-3.7	-1.7	-0.6	2.7	0.5	0.4	2.1
United Kingdom	-1.7	-2.1	-1.3	-0.8	2.8	-0.4	0.8	2.1
France	-0.8	-1.4	-1.9	-0.7	3.3	-0.1	0.8	2.6
AVERAGE	-2.7	-3.3	-1.9	-1.2	3.4	0.4	0.2	2.1

Source: Calculations based on AMECO data

We get a different picture by analysing the 10 debt reduction intervals that took place in the second period. According to the debt dynamics analysis, just over one-third of the average debt ratio reduction of 16.6 per cent (6.1 percentage points on average) is explained by *fiscal policy* (Table 5). There is no country where the effect of the primary surplus exceeds the overall debt ratio reduction. Fiscal policy enhanced the debt ratio in Spain and did not substantially lower it in Ireland and Finland.

Table 5
Decomposition of the change in debt ratio as a percentage of GDP in the 2010s

	Change in debt	Primary balance	Real GDP growth	Inflation	Nominal interest rate	Other items	Snowball	Real interest rate
		(1)	(2)	(3)	(4)	(5)	(2)+(3)+(4)	(3)+(4)
Belgium	-6.2	-5.1	-7.7	-8.8	15.9	-0.5	-0.6	7.1
Denmark	-13.1	-8.6	-5.0	-3.1	11.5	-7.9	3.4	8.4
Germany	-23.4	-18.5	-10.8	-8.7	14.0	0.5	-5.4	5.4
Ireland	-58.6	-5.4	-47.4	-1.7	11.5	-15.6	-37.6	9.8
Spain	-4.1	4.4	-13.9	-3.9	15.4	-6.2	-2.3	11.6
Netherlands	-18.8	-7.2	-6.7	-3.7	6.4	-7.6	-3.9	2.8
Austria	-15.0	-5.2	-6.8	-5.4	7.9	-5.6	-4.2	2.6
Portugal	-11.1	-9.1	-12.8	-5.7	17.0	-0.5	-1.5	11.3
Finland	-5.1	-0.3	-5.6	-2.2	3.5	-0.5	-4.4	1.3
Sweden	-11.1	-6.3	-5.4	-2.5	1.2	1.9	-6.7	-1.3
AVERAGE	-16.6	-6.1	-12.2	-4.6	10.4	-4.2	-6.3	5.9

Source: Calculations based on AMECO data

On average, the *snowball effect* was almost exactly the same as the fiscal policy effect of around 6 percentage points. This means that in this period the debt ratio-reducing effect of *real GDP growth* already exceeded the debt ratio-increasing effect of the real interest rate. In this respect, the position of Ireland is outstanding, because almost two-thirds of the debt ratio reduction can be attributed to the dynamic component. This is due to a very significant growth effect. The dynamic component was positive only in Denmark, which is related to a higher-than-average interest rate effect and a lower-than-average growth effect.

In addition to the primary balance and the snowball effect, the effect of the *other items* cannot be neglected either, as they reduced the debt ratio by an average of 4.2 percentage points. In this respect, Ireland also leads the list at -15.6 per cent (due to the privatisation of financial intermediaries rescued by the state during the international financial and economic crisis). In Sweden, however, the other items elevated the debt ratio substantially on the whole (mainly due to the exchange rate effect, i.e. the exchange rate depreciation of the Swedish krona against the euro).

When analysing debt reductions of the second period, it is also worth decomposing the change in debt ratio into years. This allows a more precise comparison of each country (*Table 6*). The comparison shows that in Denmark and Portugal the *primary balance* contributed the most to the decline in government debt ratio, by 2.1 and

1.8 percentage points per year, respectively, whereas in Spain fiscal policy raised the debt ratio by nearly 1 percentage point on an annual average.

The annual effect of *real GDP growth* was by far the greatest in Ireland (−6.8 per cent), although it was also significant in Spain (−2.8 per cent) and Portugal (−2.6 per cent). In Denmark, on the other hand, the increase in gross domestic product barely reduced the government debt ratio on an annual average.

The debt ratio-increasing effect of the *real interest rate* was largest in Spain and Portugal, totalling 2.3 percentage points per annum. As a result of the negative real interest rate, this item reduced the debt ratio in Sweden by 0.3 percentage point annually. The *other items* also supported Ireland the most on an annual average, by more than 2 percentage points, whereas in Sweden and Germany these items increased the debt ratio slightly each year.

Table 6

Decomposition of the change in debt ratio on an annual average basis, as a percentage of GDP, in the 2010s

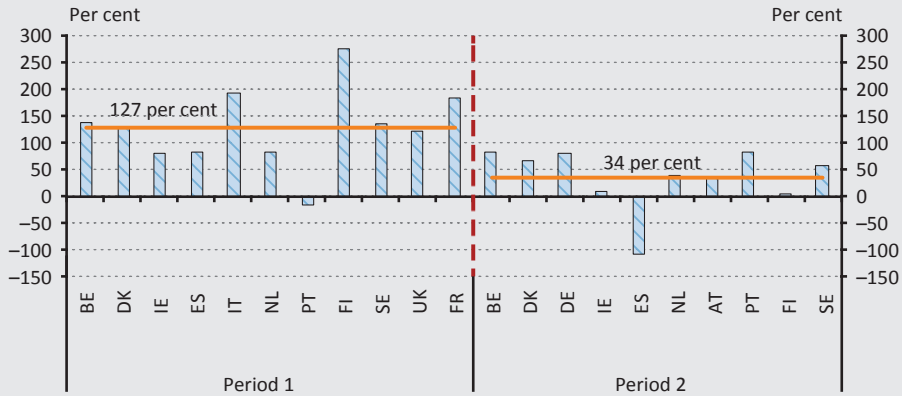
	Change in debt	Primary balance	Real GDP growth	Inflation	Nominal interest rate	Other items	Snowball	Real interest rate
		(1)	(2)	(3)	(4)	(5)	(2)+(3)+(4)	(3)+(4)
Belgium	−1.2	−1.0	−1.5	−1.8	3.2	−0.1	−0.1	1.4
Denmark	−1.6	−1.1	−0.6	−0.4	1.4	−1.0	0.4	1.0
Germany	−2.6	−2.1	−1.2	−1.0	1.6	0.1	−0.6	0.6
Ireland	−8.4	−0.8	−6.8	−0.2	1.6	−2.2	−5.4	1.4
Spain	−0.8	0.9	−2.8	−0.8	3.1	−1.2	−0.5	2.3
Netherlands	−3.8	−1.4	−1.3	−0.7	1.3	−1.5	−0.8	0.6
Austria	−3.8	−1.3	−1.7	−1.3	2.0	−1.4	−1.1	0.6
Portugal	−2.2	−1.8	−2.6	−1.1	3.4	−0.1	−0.3	2.3
Finland	−1.3	−0.1	−1.4	−0.5	0.9	−0.1	−1.1	0.3
Sweden	−2.2	−1.3	−1.1	−0.5	0.2	0.4	−1.3	−0.3
AVERAGE	−2.9	−1.1	−2.1	−0.8	1.8	−0.7	−1.1	1.0

Source: Calculations based on AMECO data

5.2. Average relative contributions

Compared to the general characteristics, there are much more pronounced differences concerning the role of each item in reducing the debt ratio. The most significant difference is related to the budget (*Figure 2*).

Figure 2
Debt-reducing effect of the primary balance compared to total debt reduction



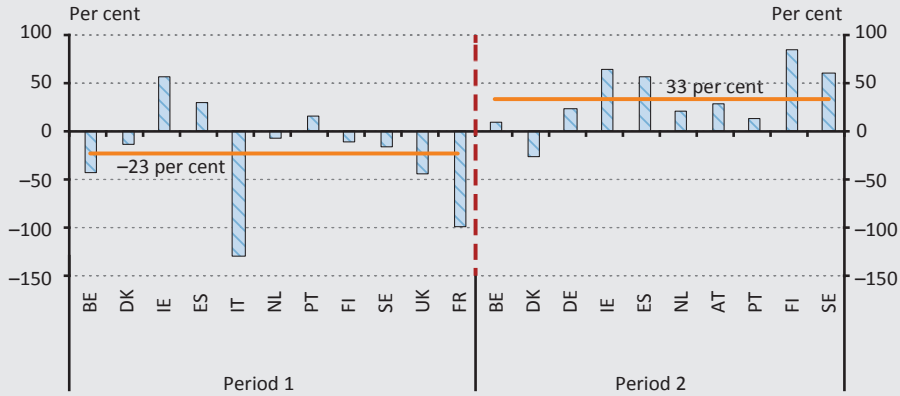
Note: The horizontal line is the average of the period. A positive value indicates contribution to debt reduction, a negative one represents the opposite effect.

Source: Calculations based on AMECO data

On average, the debt-reducing effect of the *primary balance* in the first period was 127 per cent of the total debt reduction, while in the second period it was only 34 per cent. In addition, all of this was not attributable to only one or two countries with outstanding results, but proved to be a general trend. In the first period, only one country (Portugal) did not reach the average of the second period, whereas in the second period no country approached that of the first one. It is, therefore, no exaggeration to conclude that, whereas before the crisis, the sole engine of debt reduction was disciplined fiscal policy, the role of the primary balance declined radically following the crisis.

In the two periods, the different function of fiscal policy in reducing the debt ratio obviously left its mark on other items as well. For example, the *snowball effect* (Figure 3) capturing the combined effect of the real interest rate and real GDP growth has the opposite sign in the two periods. In the first period preceding the crisis, the average snowball effect was -23 per cent. This means that the debt ratio-increasing effect of the real interest rate outweighed the opposite effect of real GDP growth, and therefore the snowball effect raised the debt. With three exceptions, this holds true for all countries. On the other hand, in the second period following the crisis, the snowball effect resulted in nearly one-third of the average debt ratio reductions. With the exception of one country, the debt ratio-reducing effect of real GDP growth was greater than that of the real interest rate everywhere (Figure 3).

Figure 3
Debt reduction effect of the snowball effect compared to the total debt reduction

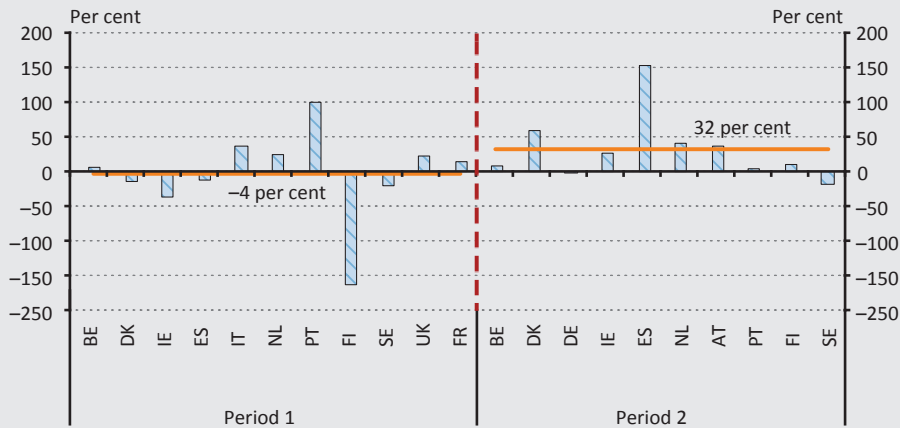


Note: The horizontal line denotes the average of the period. A positive value indicates contribution to debt reduction, a negative one represents the opposite effect.

Source: Calculations based on AMECO data

As for the effect of the *other items*, the difference is smaller compared to the above items, but also not negligible (Figure 4). In the *first period*, the other items contributed to the debt ratio reduction by an average of -4 per cent, i.e. their effect was practically neutral. In the *second period*, however, they became a major factor, contributing by an average of 32 per cent to the debt ratio reduction, i.e. similarly to the primary balance and snowball effects, they accounted for one-third of the debt reduction. Within this, the trends are well characterised by the fact that although there were differences between the individual states, the effect of the other items was positive everywhere, with one exception.

Figure 4
Debt-reducing effect of the other items compared to total debt reduction

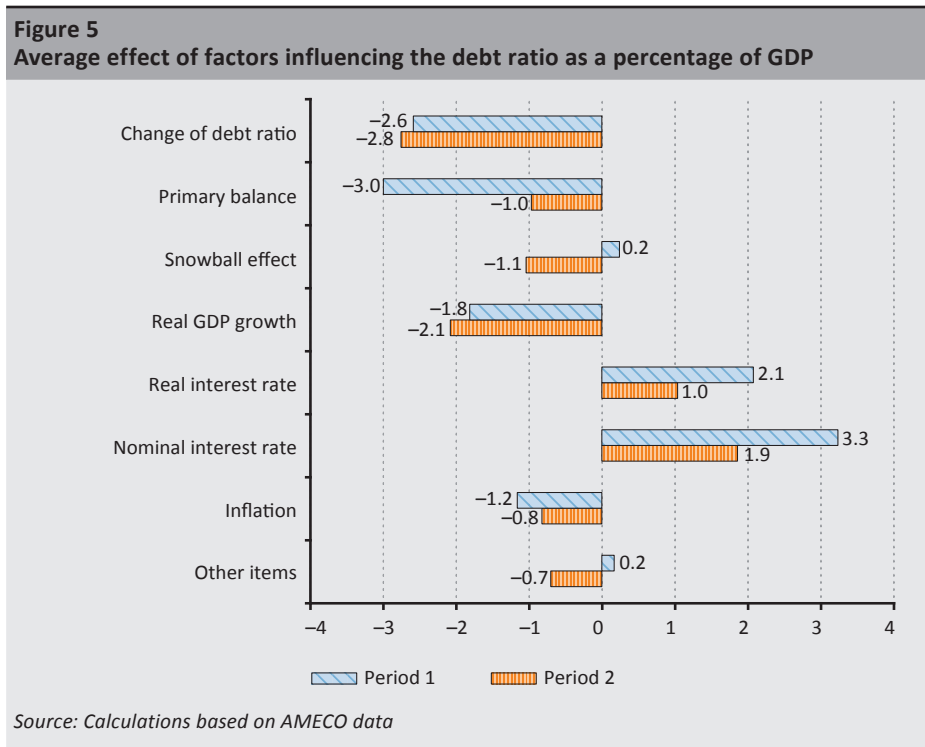


Note: The horizontal line denotes the average of the period.

Source: Calculations based on AMECO data

If the average effect of each item is averaged separately each year, then it becomes clear to what extent the two debt reduction periods are similar and to what extent they differ (Figure 5). Among other things, the basis for the comparison is that whereas in the rate of annual debt ratio reduction there is barely a difference, the same cannot be said of the contribution of the individual items. In the first period, the primary balance reduced the debt ratio by an average of 3 percentage points per annum, while in the second period it decreased it by only 1 percentage point.

The snowball effect, before the crisis, lifted the debt ratio by 0.2 percentage point, but then, after the crisis it reduced it by 1 percentage point. It is worth emphasising, however, that within this there was no significant difference in the effect of real GDP growth. This item pushed down government debt relative to GDP by approximately 2 percentage points in both periods. The difference between dynamic components is due to the different effect of the real interest rate, which in turn can be attributed to the difference between the nominal interest rate and inflation.



In the first period, the debt-increasing effect of the nominal interest rate was 3.3 percentage points and the opposite effect of inflation was 1.2 percentage points. In the second period, the influence of the nominal interest rate was much smaller (1.9 percentage points) and that of inflation was only slightly lower (–0.8 percentage

point). This means that the effect of the real interest rate was stronger in the first period than in the second one, largely due to the influence of inflation which was not much greater in the first period than the effect of the nominal interest rate, compared to the second period. In other words, the post-crisis debt reduction is partly the result of nominal interest rates falling more than the inflation rate, and therefore, the debt-increasing effect of the real interest rate was smaller than before the crisis. By way of illustration, between 2010 and 2019 the one-year money market interest rate in the euro area declined to -0.19 per cent from an annual average of 3.92 per cent in 1996–2007.

Our results concerning the structure of debt reduction before the Great Recession are broadly in line with an earlier conclusion of the European Commission's 2010 publication (*European Commission 2010*). Although they analysed a shorter period (2003–2007) of fiscal policy for the entire euro area, they found that the effect of the primary balance was twice as large as the overall debt reduction, which was partly offset by the snowball effect and the sum of the other items. Another analysis by the organisation (*European Commission 2018*) also covered the entire euro area, but for a shorter period (2015–2018) than our paper. In this, like us, they calculated that one-half of the debt reduction implemented in the euro area countries in the second half of the 2010s is attributable to the snowball effect, more than one-third to the primary balance and nearly one-tenth to the other items.

6. Summary and conclusions

The reduction of the government debt ratio of the EU Member States until 2019, as well as its effectiveness and structure, has a significant, long-term effect not only on the development of public finances, but on GDP growth as well and, more broadly, on the general macroeconomic performance of the countries concerned as well. Therefore, it is worthwhile and instructive to learn as much as possible about the quality, structure and specific aspects of the reduction in government debt ratios. The objective of our analysis was to explore, quantify and evaluate the factors and trends behind the reduction in government debt ratios. The research method used was a comparative statistical analysis based on the sample of the 15 old Member States of the European Union.

It can be highlighted as a common feature of the debt ratio reduction in the first period (before the global financial crisis) and the second one (the 2010s) that nearly two-thirds of the countries analysed had a period when the government debt ratio had contracted by at least 3 percentage points for several years. At the beginning of the decline phases, the average initial level of the government debt ratios was 72 per cent in the first period and 85 per cent in the second period, whereas it was 48 and 68 per cent at the end of these two phases. The length of reduction

averaged 9 years in the first period, but only 6 years in the second one. As a result, the rate of average annual debt ratio reduction was 2.8 percentage points in the first period and 2.6 percentage points in the second period, i.e. the pace was practically identical.

In our study, we used debt dynamics tools to answer the questions: which factors drove the moderation of the debt ratio at a similar rate on an annual average in the two periods and whether there were differences between the two apparently similar periods in this respect, and if so, what are they. Our main conclusion is that, in the first period, debt reduction was driven solely by tight, disciplined (restrictive) fiscal policy, whereas the real interest rate and real GDP growth taken together lifted the debt ratio slightly and the other factors did not substantially affect it. On the other hand, in the second period, the primary balance, the snowball effect and the sum of the other items contributed almost equally (one-third each) to the reduction in the debt ratio. It is important to point out that the effect of real GDP growth was the same in the two periods examined, and therefore the difference between snowball effects was due to the different effects of real interest rates. This, in turn, can be attributed to the fact that nominal interest rates were much lower in the second period than in the first one, whereas no such a difference was found between the inflation rates in the two periods.

In summary, it can be stated that in the first period the budget dynamised the reduction in the debt ratio, while in the second period the effect of fiscal policy weakened significantly, and the role of the lower interest rate level and the other items gained in importance. This suggests that in the second period, the reduction in the government debt ratio was fuelled more intensively by factors independent of fiscal policy, and thus, among other things, it depended heavily on loose monetary policy. Supportive monetary policy appears to have rendered fiscal policy complacent through low real interest rates. With a change in monetary conditions, this questions the long-term sustainability of trends which have gained ground in recent years. The role of fiscal policy in eliminating or at least mitigating the consequences of the Covid-19 pandemic is also prominent, in contrast to monetary policy which is actually overburdened in many respects.

The scientific novelty of our study can be summarised in that we did not discuss the factors dynamising the current debt reduction in isolation, but using a debt decomposition procedure we made a comparison to an earlier period that in many ways was similar to the current one. A further area of research could be mapping, by country, the driving forces behind the results we produced. It may be particularly instructive to compare the fiscal performance of countries involved in international programmes (IMF, EU) to that of a control group of non-programme countries. It may also be of interest to analyse the contribution of fiscal policy to economic growth (structural reforms, growth-enhancing budget investments, etc.).

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Aggregate Fiscal Stabilisation Policy: Panacea or Scapegoat?*

Gábor P. Kiss

In many cases, analyses of fiscal stabilisation are characterised by errors and omissions. This study addresses these issues. In addition to the operation of automatic stabilisers and the stabilising effect of the EU budget, we examine whether or not a stabilisation policy based on a significant change in the budget deficit can be sustainable and successful. While the economic growth rate is affected by the impulse from the changes in the deficit, the level of economic performance is affected by the deficit. However, the accumulated debt resulting from the persistent deficit is growing faster than the impact on GDP, and thus the debt ratio could start rising sharply in the foreseeable future. We show that a continuous increase in demand may be self-financing only in the unlikely event that the value of the medium-term fiscal multiplier closely approximated 3, i.e. the impact in real terms of a nominal impulse would permanently triple. A lasting, sizeable general demand increase is therefore not a panacea; however, the literature suggests that its alternatives, i.e. structural reform and targeted measures, are more appropriate and less costly for achieving higher trends of GDP growth. Similar results were obtained also in simulations based on the Hungarian experience of targeted measures.

Journal of Economic Literature (JEL) codes: E32, E61, E62, H62, H63

Keywords: fiscal policy, general demand increase, fiscal multiplier, economic policy coordination

1. Introduction

The economic crisis that started in 2007 highlighted the stabilisation role of monetary policy. By contrast, fiscal policy was less active in many countries, including the European Union, despite its traditionally strong role in economic stabilisation. The question arises as to what extent this may have contributed to the fact that economic growth did not return to its pre-crisis trend (*Lehmann et al 2020*).

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

Gábor P. Kiss is a Head of Department at the Magyar Nemzeti Bank. E-mail: kissg@mnb.hu

The author wishes to express his thanks particularly to Zoltán Bögöthy and Katalin Szőke for their help, as well as to Gergely Baksay, Endre Morvay and the two anonymous reviewers for their comments. Any remaining errors are the responsibility of the author.

The Hungarian manuscript was received on 17 March 2020.

DOI: <http://doi.org/10.33893/FER.19.2.5587>

The definition of fiscal policy includes the full range of policies concerning the budget balance as well as taxes and expenditures (Cottarelli – Keen 2012, Tanzi – Zee 1997, IMF 2015). In the context of the current fiscal policy, the question arises as to whether this policy is sustainable, as “the continued need for government financing leads to an ever-increasing public debt” (Domar 1944). Traditional functions of fiscal policy include stabilising the cyclically fluctuating economic activity, providing (allocating) public goods and redistributing income (Musgrave 1959). Discharging these functions has a direct (allocation and stabilisation) or indirect (redistribution) effect on economic performance. In some circumstances, it can be assumed that this effect may extend, in addition to the level of GDP, to potential growth rates. However, there are a number of misunderstandings about fiscal stabilisation. In the following sections, we address some current issues.

We begin section 2 by showing that growth is affected not by the deficit, but rather by the change in the deficit. Subsequently, we explain the theory regarding the effect and multiplier of this change. Section 3 responds to opinions that ignore the consensus on the optimal characteristics of discretionary measures.¹ The extreme form of this is the rejection of temporary nature, which can lead to a prolonged fiscal expansion. We prove by simple simulation that this is not possible and the obstacles are not the specific values of the Maastricht criteria.

Section 4 seeks to recall automatic stabilisers that are often ignored in the literature. Neither their effect nor the principle of “letting automatic stabilisers operate” should be forgotten. Section 5 shows that the estimation uncertainty and ex-post revision of the output gap often impede the smooth operation of automatic stabilisers and, in fact – through incorrect estimation of the cycle – this actually results in a procyclical fiscal policy. We also show an example where the aspects of stabilisation and sustainability are conflicting.

Section 6 questions the reality of the idea according to which an EU budget of a size that could lead to effective stabilisation at the level of monetary union could be created. Section 7 challenges the view that, in addition to monetary policy, it is only worth considering the instrument of the fiscal impulse to aggregate demand. On the one hand, it is recalled that the targeting of fiscal policy is crucial, as the impact of the individual measures on short-term and long-term output is very different. We show that budget-neutral measures, which apparently do not have an effect on aggregate demand, can still have positive effect.² On the other hand, we draw attention to the fact that other economic policy instruments have come to the fore. Structural and competitiveness reforms, as well as macro- and micro-

¹ Discretionary measures should be timely, temporary and targeted. Recently, the importance of the timely character, i.e., avoiding delays is recognised in the literature at most, which is necessary to avoid procyclicality.

² Matolcsy (2015), Palotai (2017), Baksay and Csomós (2014), Szoboszlai et al. (2018)

prudential instruments, in addition to the function of stabilisation, can also support potential growth.

2. Fiscal impulse and fiscal multipliers

Fiscal policy in aggregate terms (disregarding the revenue-expenditure structure) has a significant impact on economic growth when the deficit changes significantly and the value of the multiplier is high. There are different estimates of the value of short-term multipliers, whereas even the sign of long-term multipliers is uncertain. In the following, we first demonstrate the fact that it is not the deficit itself, but rather the change therein – i.e. the fiscal impulse – that affects growth. We then present estimates and theories regarding multipliers and illustrate how much of a difference it can make if we choose one or the other.

The short-term impact of fiscal policy is presented below following the deduction of *Chand (1993)*.

In a closed economy, the following identities can be formulated:

$$Y = C + I + G \quad (1)$$

$$T = t(Y), \quad (2)$$

where Y is economic output, C is household consumption, I is private investment, G is government expenditure, T is government tax revenue, and t is the effective tax rate.

Now let us assume that I and G are determined exogenously. In the case of consumption, we assume that it is the proportional share of the income in the given year:

$$C = c(Y - T), \quad (3)$$

where c is the marginal propensity to consume.

Based on (1), (2) and (3) relations, by introducing the α multiplier:

$$Y = \frac{1}{1 - c(1 - t)}(I + G) = \alpha(I + G), \quad (4)$$

and following the deduction of *Chand (1993)*, by the total differentiation and quantification of this in the previous period, we obtain the following result:

$$\Delta Y = \alpha_{-1}(\Delta I + \Delta G) + (I_{-1} + G_{-1})\{-\alpha_{-1}^2 c_{-1} \Delta t + (1 - t_{-1})\alpha_{-1}^2 \Delta c\}, \quad (5)$$

that is, the change in GDP depends on the change in the two variables assumed to be exogenous (I and G) multiplied by the multiplier of the base year, and on the change in the multiplier in the current year, which depends on the tax rate and on the marginal propensity to consume.

The effect of changes in the effective tax rate on tax revenue:

$$\Delta t Y_{-1} = \Delta T - t_{-1} \Delta Y. \quad (6)$$

The effect of changes in marginal propensity to consume on consumption:

$$\Delta c Y_{-1} = \frac{\Delta C}{1 - t_{-1}} - c_{-1} \Delta Y. \quad (7)$$

Using $Y = \alpha(I + G)$, the equation describing the change in GDP (5) can be rewritten:

$$\Delta Y = \alpha_{-1}(\Delta I + \Delta G) + Y_{-1}\{-\alpha_{-1} c_{-1} \Delta t + (1 - t_{-1})\alpha_{-1} \Delta c\}. \quad (8)$$

Substituting the equations describing the effect of the change in the effective tax rate (6) and the marginal propensity to consume (7) and dividing by Y_{-1}

$$\frac{\Delta Y}{Y_{-1}} = \alpha_{-1} \left\{ \left(\frac{\Delta I}{I_{-1}} \frac{I_{-1}}{Y_{-1}} + \frac{\Delta G}{G_{-1}} \frac{G_{-1}}{Y_{-1}} \right) - ct_{-1} \left(\frac{\Delta T}{T_{-1}} - \frac{\Delta Y}{Y_{-1}} \right) + c_{-1} \left(\frac{\Delta C}{C_{-1}} - \frac{\Delta Y}{Y_{-1}} \right) \right\}. \quad (9)$$

If we subtract the neutral trend of balanced growth (n) from the above equation breaking down the actual growth, the following equation is obtained:

$$\begin{aligned} \frac{\Delta Y}{Y_{-1}} - n = & \alpha_{-1} \left\{ \left(\frac{\Delta I}{I_{-1}} - n \right) \frac{I_{-1}}{Y_{-1}} + \left[\left(\frac{\Delta G}{G_{-1}} - n \right) \frac{G_{-1}}{Y_{-1}} \right. \right. \\ & \left. \left. - ct_{-1} \left(\frac{\Delta T}{T_{-1}} - \frac{\Delta Y}{Y_{-1}} \right) \right] + c_{-1} \left(\frac{\Delta C}{C_{-1}} - \frac{\Delta Y}{Y_{-1}} \right) \right\}. \end{aligned} \quad (10)$$

However, the question is what can be considered a measure in the case of increasing spending. Following *Chand's (1993)* deduction, it can be concluded that if the marginal propensity to consume (c) and the effective tax rate (t) do not change, then actual economic growth can only deviate from the trend (n) if the increase in investments or in government expenditure differs from the same growth trend value (n):

$$\frac{\Delta Y}{Y_{-1}} = \alpha_{-1} \left(\frac{\Delta I}{I_{-1}} \frac{I_{-1}}{Y_{-1}} + \frac{\Delta G}{G_{-1}} \frac{G_{-1}}{Y_{-1}} \right). \quad (11)$$

The deviation of the growth rate of government expenditure from the value of n represents a measure, the deviation of taxes from economic growth – apart from the progressive tax system – also indicates a measure, namely the change of the effective tax rate. It is clear from the formula that short-term GDP growth is not affected by the fiscal balance, but by its change. As a consequence, maintaining a continuously high level of short-term economic growth would require a continuing deterioration of the fiscal balance. However, a deficit increasing for a long time could at some point result in unfinanceable public debt and uncredible fiscal policy.

In formula (10), the part of the budget items in square brackets, except for the marginal propensity to consume, is the same as the so-called “Dutch” fiscal impulse (Chand 1977):

$$\frac{FI}{Y_{-1}} = \left(\frac{\Delta G}{G_{-1}} - n \right) \frac{G_{-1}}{Y_{-1}} - \left(\frac{\Delta T}{T_{-1}} - \frac{\Delta Y}{Y_{-1}} \right) \frac{T_{-1}}{Y_{-1}}. \quad (12)$$

This “Dutch” fiscal impulse indicator measures the impact of discretionary policy by eliminating the budgetary impact of changes in the economic cycle, and thus it can also be seen as the difference between the cyclically-adjusted budget balances in the current and base years. This indicator refers in principle to the first-round effect of discretionary measures, but does not adjust tax revenues for marginal propensity to consume. Now let us resolve the assumption that investment is an exogenous variable and the economy is closed. This way, discretionary measures also have an effect through the investment multiplier, and with the introduction of openness, imports (M) and exports (X) can also appear, which also affects the impact of fiscal policy. As for the consumption multiplier, this means that its size decreases by taking into account the extent of import marginal propensity (m_c) associated with consumption:

$$\alpha = \frac{1}{1 - c(1 - t) + m_c}. \quad (13)$$

Regarding the impact of fiscal policy, economic theory provides different answers, and this diversity is also reflected in the results of empirical studies. In the following, we briefly deal with the theoretical and then with the empirical approach.

Most of the modern theories accept that the short-term fiscal impact is determined by New Keynesian mechanisms, due to the fact that competition and price and wage flexibility are not perfect. All these could lead to a Keynesian lack of demand at some points in the economic cycle, meaning that a fiscal expansion will increase household disposable income, private consumption and GDP due to sticky prices and wages. This direct Keynesian effect is strengthened, for example, by the capital market imperfections and the high proportion of liquidity-constrained consumers, but may be weakened or offset by other non-Keynesian effects.

Such a weakening effect can be achieved if markets still operate more efficiently, as well as by economic openness [formula (13)], the compensating effect of labour market and competitiveness, and interest rate and exchange rate reactions. Interest rates have an effect via the interest rate sensitivity of investments³ on the one hand, and via the wealth effect on the other hand, and finally via the effect exerted on net exports by changing the interest premium.⁴ The heterogeneity of households has also a weakening effect, as these different income/wealth groups can compensate the effect of the measure through the gradual development of different lending (Hayashi 1987) or savings (Mankiw 2000) offsetting mechanisms.

An offsetting effect — and even a negative multiplier — may result from the assumption of the neoclassical school (Bernheim 1989) that the strong crowding-out effect of fiscal expansion reduces private consumption and investment, while the positive effect of labour supply on GDP is not significant. According to this argument, capital market equilibrium requires households to buy government bonds at the time of fiscal expansion and to curb private investment in order to smooth savings (Strulik – Trimborn 2013). This can lead to diminishing the capital stock and a decline in production, which will only recover in the long term.

Modern theories differ in the assessment of the size of fiscal multiplier in the medium to long term. According to the synthesis of neoclassical and Keynesian theory, the New Keynesian mechanisms act in the short term, but in the long term, neoclassical correlations prevail. Even capital stock lower in the medium term (negative medium-term multiplier) returns to equilibrium in the long run (zero long-term multiplier).

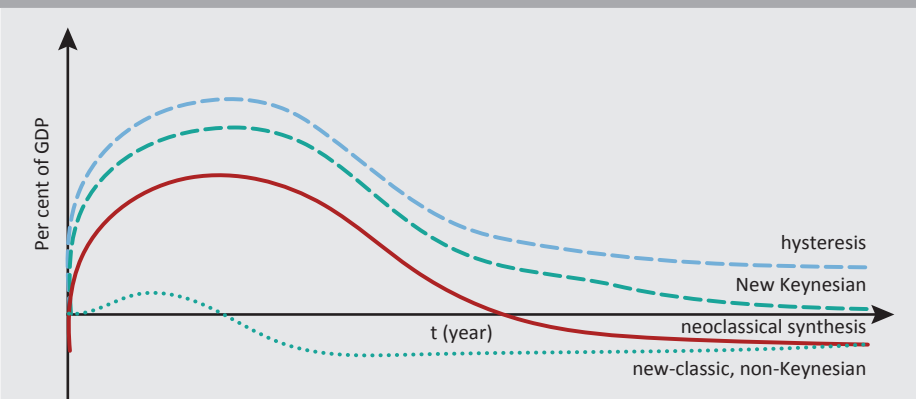
In the traditional New Keynesian approach, the multiplier decreases to zero in the medium and long term, and the economy returns to equilibrium with the natural rate of unemployment. However, in the wake of the crisis, an increasing number of economists believe that the multiplier can remain positive. They argue that potential output is endogenous, and not independent of the path of aggregate demand. Namely, during a prolonged recession, high cyclical unemployment may transform into structural unemployment, the knowledge of labour force is devalued and the labour force is excluded from the labour market, thus reducing potential GDP (DeLong – Summers 2012). Thus, the fiscal expansion that prevents this, *ceteris paribus* increases potential output, i.e. it may result in a positive multiplier even in the longer run.

³ Three factors of investment can be distinguished. In the case of autonomous investment, the marginal propensity to invest is zero. This may include public investment. The other two components of investment depend on income and interest, respectively. The inclusion of interest rates shows the channel that investments are sensitive to changes in the capital costs.

⁴ This channel may have an effect in a weak Keynesian or non-Keynesian approach. One explanation is that the credibility effect of fiscal expansion/restriction may increase/decrease the interest premium. This could appreciate/depreciate the exchange rate and reduce/increase net exports, certainly depending on whether or not monetary policy responds. Another explanation is that higher/lower interest premium can curb/boost direct investment inflows, which can worsen/improve companies' export competitiveness.

The different short- and medium-term fiscal multipliers of modern theories are summarised in schematic *Figure 1*, plotting the possible trajectories of the effect of a fiscal expansion as a function of time. This draws the attention to the fact that the short-term multiplier differs greatly from the medium-term multiplier in all theoretical frameworks and this should not be ignored when assessing fiscal stimulus (*Guest – Makin 2011*). The upper dashed line shows the effect related to the phenomenon of hysteresis, where demand-increasing fiscal policy can have a positive effect even in the long term through higher potential GDP. The next dashed line shows a weak Keynesian effect, where the correlation between the fiscal stimulus and GDP is also positive, but in the longer term it is zero. The middle, thick line gives an example of a response function corresponding to the synthesis of neoclassical and Keynesian theory, where in the medium term the channels of opposite directions exceed the Keynesian effects and in the long term this also tends to zero. The lower dotted line represents the reaction function of the neoclassical fiscal effect. Here, non-Keynesian channels will outweigh even in the short term, making the overall impact negative sooner and then also zero in the long term. This figure not only illustrates that the short- and medium-term fiscal multipliers are different, but also that the short-term multiplier should not be identified with the first-year multiplier either.⁵

Figure 1
Fiscal multipliers at the same degree of impulse



Note: The scaling of the GDP axis is intentionally missing. The purpose of the figure is to present a schema using the relative curves. Specific values depend on various factors (e.g. tax or expenditure, etc.) and are very cycle-dependent in the short-term.

Source: Plotted based on Horváth et al. (2006) and Strulik – Trimborn (2013)

Just as the theory assumes different short-, medium-, and long-term multipliers, the empirical results are also diverse. A common feature of these model-based and econometric estimates is that according to them even the impact of permanent

⁵ For similar figures, see *Strulik – Trimborn (2013)*, Figure 2; *Horváth et al. (2006)*, Figure 1.

fiscal measures will disappear within five years (*Batini et al. 2014*). This process is not linear, but shows an inverse U-shape with the maximum occurring in the second year (*Coenen et al. 2012*). If a general increase in demand is proportional for all items, almost one-half of expenditures appears directly at the level of nominal GDP, but only a smaller part of this appears in the volume (e.g. investment, but spread over 20–25 years), and a larger in the deflator (e.g. public wage increase). Moreover, due to the direct tax content of public expenditures, about one-fifth of the impulse is immediately returned as tax revenue, and thus the net impulse is that much smaller. The above factors explain why, by default, the multiplier of a general demand increase identified by a gross impulse is moderate.

On the one hand, in terms of the magnitude and trajectory of the effect, it is of paramount importance whether the fiscal shock is temporary or permanent, and in what composition it realised. The literature on expansive (non-Keynesian) fiscal consolidation has assigned a crucial role to the composition of the adjustment (e.g. *Perotti 1996*). The importance of the “Composition Matters” issue will be discussed in the last section. The size of the debt stock is also important, as the multiplier is higher when the debt ratio is lower (*Huidrom et al. 2016*). At higher debt ratios, the increase in yields as a result of deficit-increasing measures may affect the economy as a whole and thus crowd out private investment and consumption (*Bi et al. 2014*).

On the other hand, the cyclical position of the economy, the response of monetary policy and other elements of economic policy are also crucial. According to several studies, the multiplier is state-dependent, i.e. it changes during the cycle, can develop asymmetrically, and has non-linear characteristics (*Auerbach – Gorodnichenko 2012a and 2012b*). During a prolonged recession, the fiscal shock may have a lasting effect due to hysteresis⁶ (*DeLong – Summers 2012*). Monetary policy can also contribute to the longer-term impact of fiscal policy if it does not offset fiscal expansion by raising interest rates. Thus, it can extend the effect of a two-year temporary impulse for five years according to DSGE models (*Coenen et al. 2012*). Fiscal policy often forms part of a broad macroeconomic programme and is difficult to separate from it. This is what happened in the two most cited cases of “expansionary fiscal consolidation” in Denmark and Ireland.⁷

As for the fiscal multiplier, the possible reasons for the differences in the empirical literature are of a substantive nature on the one hand, and a methodological nature on the other hand. The fact that the results vary from country to country causes

⁶ While in the context of a non-sustainable recession the fiscal multiplier tends to zero, in a sustainable recession the longer-term multiplier may even exceed the short-term one (*DeLong – Summers 2012*).

⁷ In both countries, there was substantial exchange rate depreciation, interest rates and inflation fell, capital flows were liberalised, and moderated wage dynamics also reduced export prices. Ireland has also undergone a structural labour market reform, and the EU and EMU memberships have also had a positive impact. On this basis, many economist (*Eichengreen 1998, Prammer 2004, Barry 1991, Bradley – Whelan 1997*) doubt the non-Keynesian nature of the Danish and Irish fiscal adjustments.

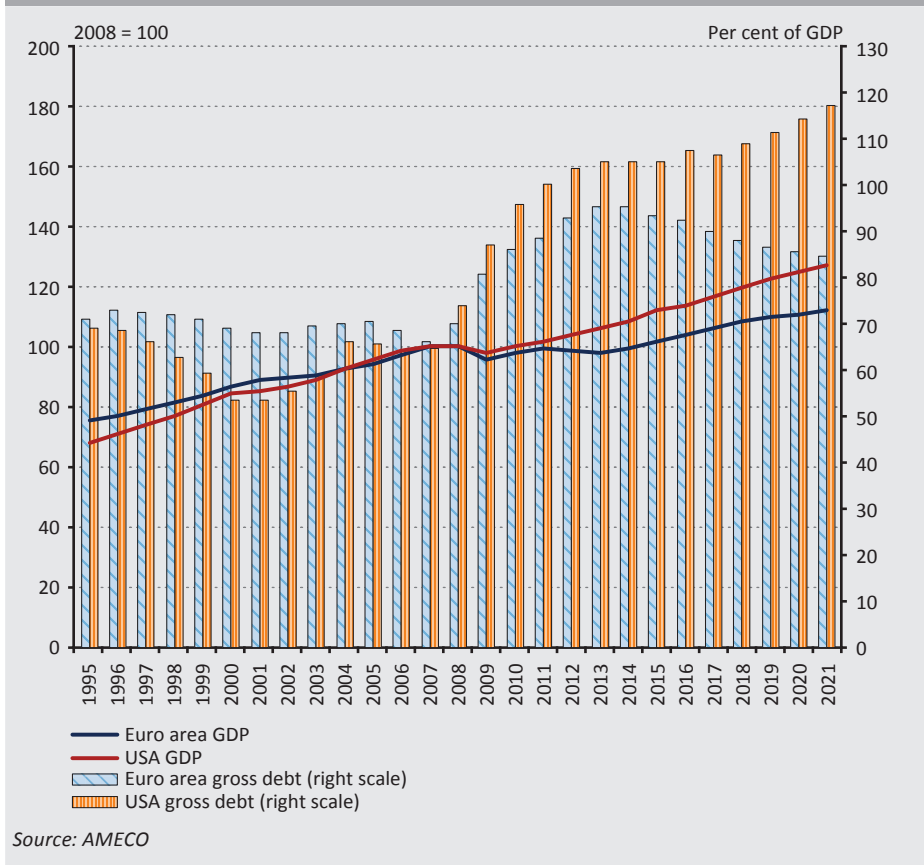
a difference in content. This is not surprising, as there are significant differences in all important dimensions, such as economic development, openness, indebtedness, monetary policy and exchange rate regimes, and nominal and real rigidities. Significant discrepancies were found between developed and less developed countries based on the databases of OECD and World Bank (*Giavazzi et al. 2000*). Even within developed countries, there were results different in sign between the United States and the United Kingdom (*Jones et al. 2015*), which may be attributable to the unique characteristics of the United States. Based on these, a uniform fiscal recipe is not conceivable even for aggregate fiscal stabilisation (not to mention the composition of fiscal measures, which will be discussed in more detail in the last section).

A methodological problem is how the relationship between fiscal policy and other variables can be taken into account in the estimation. In the simulations performed based on the DSGE model (*Coenen et al. 2012*), detailed correlations between the variables, including microeconomic decisions as well, are dominant, but they cannot handle the state-dependent (asymmetric and non-linear) characteristics of the multipliers. Empirical estimates (regression, VAR, SVAR) are usually also linear, and thus the state-dependent nature can only be captured in special cases (*Auerbach – Gorodnichenko 2012a and 2012b*). Another methodological problem, which we will return to later, is that discretionary measures are often identified as a change in the cyclically-adjusted (primary) deficit, which leads to bias, as the impact of financial cycles is not eliminated. Exogenous fiscal shocks are not properly defined in this framework for other reasons as well. For example, *Romer and Romer (2010)* distinguish four types of reasons in the case of tax measures. The first two are endogenous (related to other effects on output), namely measures offsetting expenditure and other effects on output in the near future. By contrast, measures taken to reduce accumulated debt and achieve long-term goals can be considered exogenous measures. In order to define these latter measures, a narrative method based on the direct estimation of individual tax measures has been developed. This also draws the attention to another methodological problem, namely, the composition of the measures, i.e. what types of taxes and expenditures change. In their study ‘Does “The” Fiscal Multiplier Exist?’, *Baksa et al. (2014)* find that there is no single fiscal multiplier and that different forms of fiscal expansion (the forms examined: VAT, PIT, social contributions, financial transfers, public expenditure) have different multipliers. Model-based approaches generally agree that permanent changes in indirect taxes, transfers, and government consumption have only a short-term effect on output, and this will also disappear within five years (*Coenen et al. 2012*). By contrast, a sustained change in public investment or corporate taxes can even have a lasting effect and may persist for over five years because it affects the capital stock of the economy (*Coenen et al. 2012*). If we consider a general demand increase, the weight of these more permanent items is much lower than that of short-term items, and therefore their impact will be determining.

3. Illustration of an unpleasant arithmetic

In the following, we provide a simple illustration of the significance of multipliers. *Figure 2* shows that government debt was very similar in the euro area and in the USA in 1995 and 2007, and the gap between them has been steadily increasing since then, similar to GDP. In the illustration, we examine how much the euro area's debt would be in a scenario where a general demand increasing fiscal policy would provide a steady 3 per cent growth rate between 1995 and 2019. A 3 per cent annual growth would close the gap between the USA and the euro area in 1995 and 2007, and after 2008, not only would the growth rate not diverge, but even a one-off decline in level in the USA would not occur. To achieve this fixed growth rate, the higher the deficit and debt growth are the smaller the multiplier must be and, conversely, a larger multiplier requires a less steep deficit expansion. To find out whether continuous aggregate expansion is a panacea or just a blame-shifting device, we performed simulations for both possible and impossible values of the multiplier.

Figure 2
Economic growth and debt rate in the USA and euro area



Source: AMECO

In the simulation, we made different assumptions, and if there was a choice, we opted for the more optimistic version, resulting in a lower debt ratio. One exception to this is the choice of multipliers, as our goal here is exactly to present the different scenarios. The baseline scenario is based on a New Keynesian effect, which has the following multipliers for five years: *0.5; 0.7; 0.5; 0.3; 0.1*; and then zero afterwards. We also calculated a variant corresponding to the neoclassical synthesis, which assumes a multiplier *0.1* lower than the previous one over the entire time horizon; thus, it can also be considered as a sensitivity analysis. The intuitive background of the multiplier's near-zero mid-term value is as follows: Given a nominal demand increase corresponding to 1 per cent of GDP, 37 per cent of this will return to the budget (this was the value of tax centralisation in the euro area in 2008). The net impulse is thus 0.63, half of which appears, let us say, in the deflators (government consumption deflator, CPI) and the other half in the real variables. In the case of an open economy, one-half of the real effect increases the production of real GDP, i.e. it is about 0.16. Due to various compensatory mechanisms, this may be close to zero in the medium term.

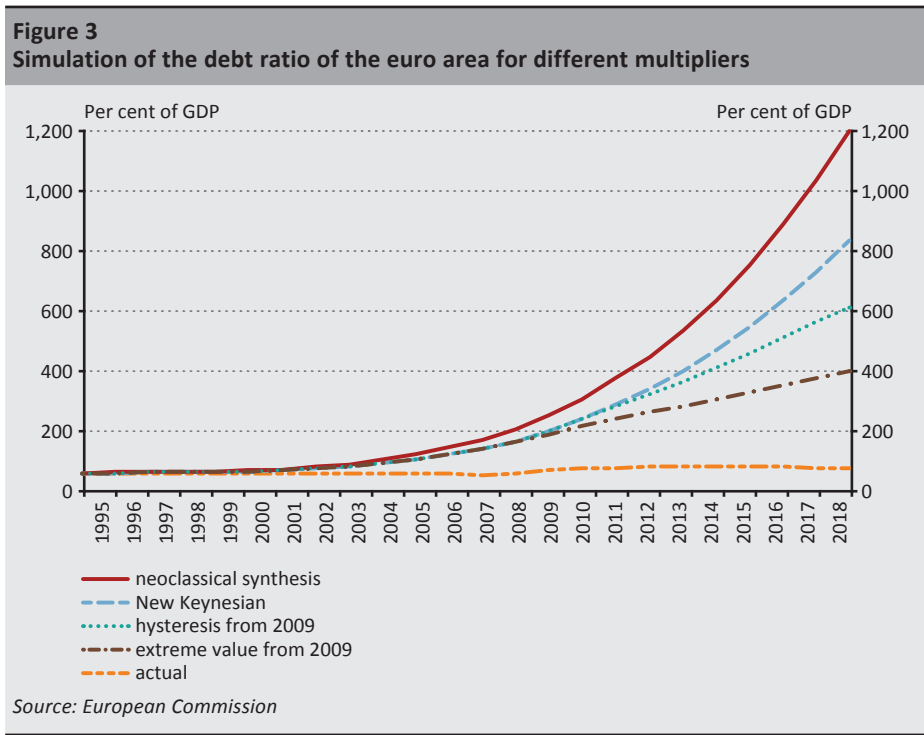
In addition to these two trajectories, we also assumed a hysteresis scenario between 2009 and 2018, where the multiplier is *0.63* higher over the entire time horizon. In order to show the maximum possible growth and minimum debt ratio effect, we assumed for this entire period that the conditions for hysteresis may have been met. As the net impulse reduced by the tax-content is 0.63, this multiplier value can be considered as a medium-term extreme value where the impulse applies 100 per cent, in other words, significant spillover through openness, neutralisation channels and deflator is offset fully and for a long period by positive effects on capital stock or unemployment (we also disregarded the limits of the latter). This is an optimistic assumption if we consider that this does not involve a targeted measure, but rather a general increase in demand, when actors who do not need it also benefit from the impulse, and thus their activity is not affected. For the purpose of a sensitivity analysis, we prepared an even more optimistic scenario, which can be considered extreme, where, from 2009 onwards, the multiplier was *1.7* higher than the baseline.

There is a medium-term multiplier where the expansion is self-financing, and this can be derived from the tax centralisation based on formula (13). Even if the effect of other variables (openness, marginal propensity to consume) may be offset by other factors, in terms of the deficit the amount of tax revenue that is recovered is what matters. This value is 2.7 for a 37 per cent tax centralisation, which is outside the range of multipliers that can be realistically considered. In this case, nominal debt does not change, but the debt ratio decreases due to higher GDP. Taking this effect into account, by ensuring an unchanged debt ratio, the self-financing medium-term multiplier is 2.55.

If in the medium term a 1 per cent impulse does not result in almost three times the level of GDP, the recovery from tax will not be enough to be self-financing. In this

case, the impulses of the individual years accumulate into deficits and the deficits into debt. As a result of the deficit, GDP is higher, but this can only moderate the increase in the debt ratio resulting from the accumulation of deficits. The result, as shown in the figure, is exponentially growing debt.

In the illustrative calculation, we added to the actual deficit and debt trajectory the increasing deficit which is required to maintain a steady growth rate of 3 per cent,⁸ i.e. the interest on accrued debt with the implicit interest rate calculated based on the actual interest payment and actual debt. Beyond a certain debt level, it becomes unrealistic, but we assume that the interest premium will not increase due to higher debt, which means that our calculation can be considered as an absolute lower-bound estimate of deficit and debt. The nominal debt thus obtained is adjusted by the difference between the actual GDP and the GDP obtained based on 3 per cent growth, as higher GDP *ceteris paribus* reduces the debt ratio.



⁸ Extent of required impulse:

$$expenditure_t = \left\{ 1.03 gdp_{t-1} - \left(1 + \sum_{i=1996}^t expenditure_i multiplier_{t-i} \right) \right\} \frac{gdp_{t-1}}{multiplier_0},$$

where $multiplier_0$ means the immediate effect of measure. As a result, the rate of debt ratio in year t compared to the 1995 ratio is:

$$tax\ rate_t = \frac{1 + \sum_{i=1996}^t (1 - tax\ centralisation) \cdot expenditure_i}{\sum_{i=1996}^t (1 + expenditure_i multiplier_{t-i})}.$$

The results show that between 1995 and 2008, the debt ratio would have increased with a weak New Keynesian effect by 107 per cent of GDP (of which 9 percentage points is interest expenditure) compared to the actual data, and by 148 per cent (interest spending: 14 percentage points) for the neoclassical synthesis. In the hysteresis scenario, the change in the debt ratio between 2008 and 2018 is more than 442 percentage points (of which 72 percentage points are interest expenditures) and this exceeds, even at extreme values, the increase of 228 percentage points (of which 49 percentage points is interest spending). This shows that the costs of expansion outweigh the resulting benefits relatively quickly over time: in other words, sustained demand stimulation cannot be considered a panacea. The consensus on the optimal characteristics of a discretionary measure, which emphasises the temporary nature, is therefore founded.

On the basis of the illustrative calculation, it can be established that a substantial and general increase in demand for a long period of time would be restricted by costs significant even in the medium term, even if the Maastricht deficit and debt rules – which are sometimes considered too strict – did not exist. It should be noted that the EU's fiscal framework is much more complex than these two restrictions, making it more difficult to judge whether it sets appropriate stabilisation and sustainability targets, and applies adequate parameters to achieve them, and how it manages the potential trade-offs between objectives. During the continuous change of the framework, the role of the originally less important stock indicator (debt) increased in parallel with the strengthening of the sustainability aspect, and on the other hand, the effectiveness of the stabilisation function required a stronger emphasis on the structural balance target (medium-term objective, MTO). The MTO set for each Member State provides a sufficient safety margin against breaching the Maastricht 3 per cent threshold in the case of normal (non-exceptional) cyclical fluctuations.⁹ Whereas previously the consistency of the thresholds of Maastricht deficit ratio and debt ratio has been examined, today the MTO can be compared as the threshold of a practical target close to zero and the debt. Based on this, the current trend of lower nominal GDP growth is also sufficient to stabilise the debt ratio at the threshold (*cf. Lehmann et al. 2020: Figure 3*).

4. Automatic stabilisers and discretionary fiscal measures

The effect of automatic stabilisers is not spectacular, and regarding this, the principle of “letting automatic stabilisers operate” was formulated. In other words, this means that, offsetting measures should not be taken. Fiscal policy makers, *mutatis mutandis*, focus on the latter, on the specific discretionary measures.

⁹ In addition, the occurrence of an exceptional event or a lasting and severe economic downturn means an exemption for the Member State. This was defined as a negative growth rate or as an accumulated loss of output during a protracted period of very low real growth of GDP relative to its potential.

However, with the exception of the narrative method, which focuses on individual measures, other analyses and research identify the change in the cyclically-adjusted (primary) balance as an estimate of the overall amount of a discretionary measure. On the one hand, there is a conceptual problem with this approach, since by eliminating the cyclical component, automatic stabilisers are omitted, which in turn do have an effect (otherwise they would not make sense). On the other hand, from a methodological point of view, there have been a number of criticisms of the cyclical adjustment, including that it only partially eliminates the impact of the financial cycle. Thus, the uneliminated part is included in the category of “discretionary measure” on a residual basis, thereby causing systematic bias in estimating the impact of fiscal policy (*Guajardo et al. 2011*).

Next, we first address automatic stabilisers and then discuss why the cyclically-adjusted (primary) balance is not a good approximation to discretionary fiscal action in methodological terms.

For the sake of simplicity, formula (6) assumed that the tax system was not progressive. In the case of progressive tax systems that can be observed in reality, high marginal tax rates reduce the multiplier effect and thereby the sensitivity of the economy to shocks. *Musgrave (1959)* called this function of the progressive tax system “built-in stabilisers”. According to a narrower definition in this sense, the effect of automatic stabilisers is such that unemployment benefits (U) and progressive taxes (T) follow automatically and to an extent more than equiproportional the fluctuations in economic performance (GDP) (the balance of these two items is $T^* = T - U$). The ability to stabilise varies over time as the trends in the tax system, social benefits and demography change (*Duesenberry et al. 1960*). It is important to note that taxes and benefits do not directly follow the development of GDP , but the development of tax bases and unemployment. Most of all these (e.g. personal taxes and contributions) follow the decline in GDP with a time lag if the decline is caused by a shock due to external demand or investment. Thus, the effect of automatic stabilisers in a narrow sense occurs with the right timing, which occurs mostly through changes in the disposable income of the population. In addition to this effect, the redistribution channel may also play a role, because if the income of households that spend their expenditures increases on account of taxpayer/saving households, aggregate demand will increase even more (*Blinder 1975*). Moreover, progressive personal taxes also have an incentive effect on labour supply that ensures stabilisation (*Christiano 1984*).

From among the above three channels, we now address the crucial question of the potential impact of automatic stabilisers in a narrow sense exerted through aggregate demand.

Let the elasticity of tax revenue be ε , that is $\varepsilon = \frac{\Delta T}{T_{-1}^*} \frac{\Delta Y}{Y_{-1}}$ and thus formula (12) can be transformed:

$$\frac{FI}{Y_{-1}} = \left(\frac{\Delta G}{G_{-1}} - n \right) \frac{G_{-1}}{Y_{-1}} - (\varepsilon - 1) \frac{\Delta Y}{Y_{-1}} \frac{T_{-1}^*}{Y_{-1}}. \quad (14)$$

According to the narrow definition of automatic stabilisers, this impulse is equal to the extent to which these items follow the fluctuation of GDP by more than one unit ($\varepsilon - 1$).

Considering the EU as a whole, the official estimate of the specific (for a 1 per cent change in GDP) fiscal impulse provided by narrow automatic stabilisers is currently 0.229, of which the effect of tax progressivity is 0.171 and unemployment benefit is 0.057.¹⁰

Let us turn now to the full definition of automatic stabilisers. This includes the effect of all revenue and expenditure except interest expenses. This is explained by the fact that neutral fiscal policy also has an automatic stabilising effect. If we deduct from the primary balance tax revenue and unemployment expenditure which are affected by the cycle, then we obtain non-tax revenue and primary expenditure without unemployment benefits. These are increased by the government in a discretionary manner, in neutral cases at the rate of potential/trend GDP growth.¹¹ It can be deduced that the cyclical component is equal to the full automatic stabilising effect if the primary balance is zero.¹² This is broadly true at the EU level, and thus in principle the cyclical component could be very close to the automatic stabiliser effect.¹³ According to official estimates for the EU, 1 per cent shift in GDP changes the cyclical component by 0.537 percentage points (*Mourre et al. 2019*). However, this cannot be considered appropriate for two reasons. On the one hand, it does not take for a basis the primary balance items because it does not adjust for interest expenditure. On the other hand, taxes should be identified with the taxes of the private sector (*Jedrzejowicz et al. 2009*). This not only reduces the cyclical component, as due to the parallel adjustment for taxes and expenditures the effect for narrower stabilisers (formula (14)) and the overall stabilisation effect for expenditure will be concurrently smaller. This means that the specific stabiliser effect at the EU level may not be the officially estimated 0.537, but about 0.450,

¹⁰ Based on tables in Part I of the Appendix, *Mourre et al. (2019)*

¹¹ In the case of taxes, there are not only rates, but also a number of other parameters, the change in which can be considered as a measure. In this framework, the annual valorisation of the nominal elements of the tax system (bands, ceilings, etc.) presents a problem. In a neutral case, although valorisation takes place, this is not a measure, as the tax burden does not change due to this. However, the lack of valorisation is a tax burden increasing measure.

¹² *P. Kiss (2011:30)*: Box 5: "The fiscal impact of the cycle vs. the stabilising effect of fiscal policy"

¹³ The EU had a primary surplus of just over 1 per cent of GDP in 2018, representing a minimal bias compared to the assumption of a balanced budget.

i.e. in the case of a shock of 1 per cent of GDP, public finances will offset 45 per cent:¹⁴ on the one hand, netting against public taxes affects the estimated extent of narrow automatic stabilisers (0.229), reducing its specific rate to about 0.190, while on the other hand, neutral items also netted against taxes explain the 0.260 value remaining from 0.450.

So far, we have assumed that cyclical adjustment properly eliminates the impact of different cyclical fluctuations on revenues. However, this is not the case for methodological reasons, because, after performing the cyclical adjustment, a substantial and volatile unexplainable part remains (*Morris et al. 2009*).¹⁵ Even in the case of the USA it can be shown that cyclical adjustment does not address the effect of asset price volatility (*CBO 2013*). Asset prices also have a distorting effect at the level of OECD countries (*Price – Dang 2011*). All these can cause systematic bias in estimating the impact of fiscal policy (*Guajardo et al. 2011*). This is because the positive effect of asset prices was not eliminated by the cyclical adjustment, and thus it seemed to be a balance-improving measure if – in order to determine the measure – an analysis took as a basis a change in the cyclically-adjusted primary balance (as most did). If the increase in asset prices was followed by an increase in output, a correlation could be found between the apparent balance improvement and the increase. In this situation, traditional methods of cyclical adjustment could have been replaced by the “finance-neutral” output gap method (*Borio et al. 2013*). Namely, traditional “inflation-neutral” methods, due to several factors, such as the distortion of the Phillips curve, do not work reliably in a low-inflation environment. A methodology is proposed that can be evaluated even in a low inflation environment and results in low-revision data. The authors received much more accurate data for the historical data of the USA and other countries than the OECD and the International Monetary Fund had previously received. Prior to the global economic crisis, real-time data showed that the economies of the USA, the UK and Spain were characterised by a negative or at most a closed output gap, depending on the methodology chosen, but ex post reviews pointed out the shortcomings of traditional methodologies. The model developed by *Borio et al. (2013)*, which also takes into account the build-up of financial cycles through increases in real estate prices and credit aggregates, shows a substantial positive output gap considering both real-time data and the retrospective method. In addition, the degree of ex-post revision is reduced to a minimum. According to their estimate, while business cycles last at most for 8 years, financial cycles typically

¹⁴ At the EU level, tax and contribution revenues account for 33 per cent of GDP, one-quarter to one-fifth of which may stem from public spending.

¹⁵ Profit taxes caused extra tax revenue (windfall) in 1999–2000 and 2004–2007, and extra tax loss (shortfall) in 2001–2003 in Germany, Spain, France, Italy and the Netherlands. This was due, in addition to loss relief, to revaluation gains. Cyclical adjustment does not cover housing investment, and thus only the cycle of consumption has been eliminated from indirect taxes. This caused unexplained residuals in Ireland and Spain.

alternate every 16 to 20 years. Building on the results of the research by *Borio et al. (2013)*, *Bernhofer et al. (2014)* also found that traditional (inflation-neutral) methods of the output gap cannot signal recovery due to financial cycles. A novelty compared to previous research is that the authors also set apart in the model the trend and cyclical change in GDP, and examine two groups of countries, one developing and one developed. Calculating using the new methodology, the cyclical component of GDP was much higher for most countries in the pre-crisis period than the value of the cyclical component calculated using traditional methods. Depending on the country, real output – which is substantially higher than potential – was the result of rising real estate prices, rising lending activity, or a combination of these two factors. In the next section, we present the consequences of a biased estimate of the output gap.

5. Real time uncertainty of potential/trend GDP

We have seen that the equilibrium parameter n is a determining factor of formula (10) and thus a key element of the overall definition of automatic stabilisers as well as the discretionary measure defined relative to the neutral path calculated in this way.

Several studies (*Forni – Momigliano 2004*, *Cimadomo 2008*, *Borio et al. 2013*, *Bernhofer et al. 2014*) have shown that the estimation of the output gap in real time, i.e. when fiscal policy decisions were made, differed significantly from what could be estimated based on subsequent developments. Subsequent revisions of the output gap stemmed from the fact that the estimation of potential growth subsequently worsened, and thus an output gap that previously seemed to be positive turned out to be negative in retrospect (*Table 1*). As a consequence, in many countries, fiscal policy intended to be counter-cyclical between 1994 and 2006 was subsequently proven to be pro-cyclical (*Caudal et al. 2013*, *Forni – Momigliano 2004*, *Cimadomo 2008*, *P. Kiss 2017*). The estimate of potential GDP before the crisis may have been distorted upwards by the emergence of the financial cycle in addition to business cycles (*Borio et al. 2013*, *Bernhofer et al. 2014*). *Rogoff (2016)* points out that, as a consequence of the financial cycle, the size of housing bubble accompanied by leverage and its bursting, as well as the extent of pre- and post-crisis asset price changes were significant. In addition to *Boone and Buti (2019)*, *Benoît Cœuré (2017)* also points out that the downward revision of the estimate for potential GDP has a trend regardless of the phenomenon of hysteresis.¹⁶

¹⁶ “These effects have been taken by many as evidence for hysteresis. But the discussion is arguably more complex than this. For sure, potential output estimates are chronically unreliable and often subject to substantial revisions ex post. [...] P(p)otential output growth had been slowing in the euro area well before the crisis, mainly reflecting a long-term slowdown in total factor productivity (TFP).” (*Cœuré 2017*)

Table 1
Estimate of the output gap for a given year in the previous year and in 2019 (as a percentage of GDP)

YEAR	2000		2001		2002		2003	
	1999	2019	2000	2019	2001	2019	2002	2019
Austria	0,6	1,6	-0,5	0,4	-1,1	-0,1	-0,4	-1,3
Belgium	-2,0	1,8	0,8	0,5	-0,3	0,0	-0,4	-1,0
Denmark	-2,9	2,7	0,0	1,4	0,4	0,2	-0,1	-0,7
Finland	-2,2	2,9	1,0	1,3	1,8	-0,4	-0,3	-1,6
France	-2,7	2,2	1,8	2,2	-0,6	1,6	-0,3	0,7
Germany	-0,1	1,4	-0,1	1,7	-1,5	0,3	-1,4	-1,6
Greece	-0,2	1,3	1,3	1,3	2,2	1,2	1,8	2,2
Ireland	0,3	4,5	1,5	2,2	0,2	1,4	-1,4	-1,2
Italy	-2,3	1,9	-2,4	2,4	-0,9	1,5	-1,3	0,7
Luxemburg	-2,1	5,9	-1,1	3,4	-3,0	2,9	0,0	0,3
Netherlands	-3,3	2,4	2,0	1,6	-1,1	-0,6	-1,8	-2,4
Portugal	0,1	3,0	-1,0	2,1	-1,5	0,8	-2,8	-1,5
Spain	-3,2	3,0	0,1	3,5	-0,9	2,9	-1,5	2,3
Sweden	-0,9	1,7	0,3	0,0	0,7	-0,8	-0,1	-1,4
United Kingdom	-0,8	1,1	1,2	0,9	-1,0	0,2	-0,9	0,7

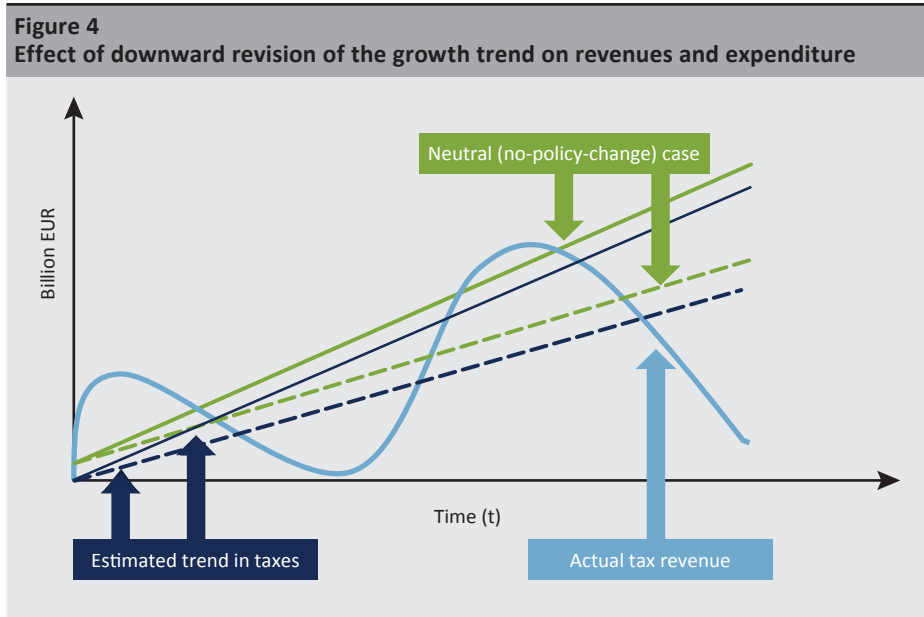
Note: Blue colour: the sign was estimated right, red colour: even the sign was not estimated right.

Source: EC (1999, 2000, 2001, 2002) és AMECO

Figure 4 illustrates the problem caused by real-time uncertainty of the output gap in shaping the right direction of fiscal policy, even if the goal would be to “let automatic stabilisers operate”. In the figure, real-time no-policy-change growth in expenditure is in line with the trend in tax revenues, which, in the absence of measures, follows the pace of economic growth.¹⁷ If, after a significant downturn, it subsequently turns out that the trend in growth and thus tax revenues needs to be corrected downward (dashed blue line), the consistent neutral expenditure path (dashed green line) will also change. It only then becomes apparent that the expenditure intended to be neutral was expansive throughout; the cumulative rate of expansion is the difference between the dashed and full green lines (contrary to the intention, the automatic stabilisers were not allowed to operate). The higher cyclically-adjusted deficit in this case indicates that expenditure is higher than the neutral level and will therefore need to be adjusted at some point, preferably not during the crisis. If further counter-cyclical expansion measures are taken during the crisis, this adjustment deferred to the time of recovery will be even greater.

¹⁷ For the definition of discretionary expenditure, the definition of neutral expenditure growth is required as a benchmark. The actual spending path can thus at all times be split into a neutral and discretionary part.

Here, however, as mentioned in the introduction, in the case of a high debt ratio, the sustainability aspect may conflict with the stabilisation function.



6. Stabilisation in a monetary union; automatic stabilisers and discretionary measures

The member states of a monetary union have their own fiscal policy to stabilise their economies, as exchange rate adjustment within the monetary union is no longer possible and the correction of relative prices is a slower process. In the case of individual negative shocks impacting individual countries, the distribution of risk within the monetary union can also contribute to stabilisation. One element of this is to weaken the link between local income and consumption through an integrated capital market, and the other is to break the link between local credit supply and the capital of local banks through the integration of the banking sector. These two factors neutralise 70 per cent of local shocks in the United States, while only neutralising 25 per cent in the euro area (*Nikolov 2016*). In the past, there has even been pro-cyclicality in the euro area, resulting in lending across countries in good times and repayment in bad times (*Albertazzi – Botero 2014*). The Five Presidents' Report (*Juncker et al. 2015*) therefore identified the completion of a Financial Union as a second objective in time, as part of which a single bank supervision, a single bank resolution (Single Resolution Fund, Single Resolution Mechanism), a single deposit insurance (European Deposit Insurance Scheme) and a Capital Markets

Union can be created. Macroprudential policy is also important because, if properly targeted, it can reduce the side effects of low interest rates (*Draghi 2019*).

Compared to the potential stabilising effect of these factors, the significance of fiscal transfers between Member States may be much less. Even in countries establishing significant fiscal federalism, such as the United States, only 10 per cent of shocks are neutralised by fiscal transfers provided to states (*Nikolov 2016*). *Dreyer and Schmid (2015)* showed that the level of stabilisation and redistribution similar to the USA's system would require a much larger transfer between euro area countries. The Five President's Report (*Juncker et al. 2015*) set the completion of a Fiscal Union as the third goal in time. An instrument, called automatic stabilisation, would be introduced in the euro area, which does not aim to stabilise the euro area as a whole, but to mitigate the effects of shocks *in general*. However, this should not lead to permanent, one-way transfers between countries, as it cannot not be conceived as a way to equalise incomes between Member States. It would not replace the European Stability Mechanism (ESM), which remains a crisis management instrument, but would prevent its use. Proposals made since then would use transfers between governments. Member States would contribute to a fund from which they can automatically receive a transfer depending on the development of their macroeconomic variables. Proposals differ in terms of the use of resources: some would give transfers to households (unemployment benefits) and some would spend it on public investment. The former could respond immediately to an economic downturn, that is, it could channel funds to households in parallel with rising unemployment. The latter can only react to a downturn with a delay, as the measurement of economic indicators may be deferred in time and the preparation of public investments may be a protracted process.

According to the definitions in *Section 4*, only unemployment benefits can be classified as an automatic stabiliser, while the other as a discretionary measure. In the narrow sense, a progressive tax system and unemployment benefits, and in a more broad sense, expenditure growth kept stable represent an automatic stabiliser, the latter element would neutralise shocks to the euro area as a whole, and not to shocks at the level of the individual Member States.

On the revenue side, the EU's common budget is not progressive and does not automatically follow the cycle,¹⁸ while structural transfers – which account for the majority of expenditure – are not smooth. They fluctuate corresponding to the seven-year programming periods, and thus whether or not they correspond to a discretionary measure with a counter-cyclical or pro-cyclical effect is random. The

¹⁸ However, based on the development of GNI in the previous year, corrections are applied to Member States' contributions.

size of the common budget is around 1 per cent of EU GDP; therefore, at present, it cannot be considered a stabilising factor either in principle or in practice.

Let us do a simple thought experiment about what might change in the future: On the one hand, the common budget could centralise the Member States' existing expenditure (together with the revenue covering the same). The largest items of the Member States are administration, education, health, pensions, unemployment and family benefits, and corporate subsidies. Centralisation of any of these items is not justified. Centralisation of defence expenditures is not realistic either, but in this regard a minimal amount is conceivable. In the case of environmental and R&D subsidies, partial centralisation cannot be ruled out, but the total amount would realistically remain below 1 per cent of GDP. On the other hand, the common budget could find additional expenditure, but this would also require additional funds, i.e. taxes at EU level would need to be increased for that.¹⁹ Continuing the thought experiment, these expenditures could be the previously mentioned stabilisation subsidies, for which perhaps an amount of around 1 per cent of GDP might be enough. Overall, the common budget would increase to a maximum of 3 per cent of GDP, of which stable expenditures would total 1 per cent of GDP, another 1 per cent would fluctuate in line with the seven-year programming period, and the additional 1 per cent stabilisation support could be counter-cyclical. Accordingly, while at the level of EU Member States a specific stabilising effect of 0.537 can be estimated for a 1 per cent decline (see *Section 4*), the stabilising effect of the 1 per cent counter-cyclical part of the common budget would be 0.010. Thus, the result of our thought experiment would apparently have no considerable stabilising role. However, a discretionary stabilisation expenditure of 1 per cent at EU level could cover counter-cyclical measures of up to 4–5 per cent of GDP at the level of countries receiving support.

7. Fiscal policy coordination and structural reforms

So far, we addressed the aggregate stabilisation policy that is implemented through a general increase or reduction of demand. In the following, we discuss targeted measures, including the special case where they are implemented in a balance-neutral manner by changing the revenue-expenditure structure. Targeted measures can be linked also to structural reforms, which will also be addressed.

By way of introduction, we examine the issue of coordination. The aim of the European Semester was to strengthen economic policy coordination between Member States, but as the Five Presidents' Report (*Juncker et al. 2015*) pointed

¹⁹ A common European unemployment benefit system, which would complement national unemployment benefit systems, could work well in terms of stabilisation, but could lead to distortions at the level of Member States operating different systems. Not only the additional amounts would be different in proportions, but the duration of the benefit could also vary significantly.

out, many regulations and procedures were too complex and not efficient enough. The recommendations should be directed at the structural reforms required to improve the efficiency of the single market and to increase potential economic growth. The importance of the government balance and the aggregate stabilisation policy implemented through its change is thus diminishing for several reasons. In addition to structural reforms, the composition of fiscal policy becomes increasingly important, and within the framework of Macroeconomic Imbalance Procedure aspects, such as the prevention of real estate bubbles and the early detection of declining competitiveness, the rising private and public debt and underinvestment emerge, which may require targeted reforms.

It is important to identify the causes, as, for example, specific steps depend on the factors behind an economic downturn. The Magyar Nemzeti Bank's 2015 Growth Report (*MNB 2015*) reviewed the potential causes of the crisis. Of these, financial factors typically exert a temporary, albeit prolonged, effect on economic growth. To mitigate these problems, general or targeted demand increase may be required (*Table 2*).

Table 2	
Fiscal reaction to cyclical problems in the economy	
Balance sheet crisis	Counter-cyclical fiscal policy
possible financial causes: <ul style="list-style-type: none"> – rise in lending – excessive indebtedness – balance sheet adjustments – sectoral re-allocation 	possible fiscal measures: <ul style="list-style-type: none"> – general demand increase – targeted demand increase: <ul style="list-style-type: none"> • capital transfers • public investments
<i>Source: Based on MNB (2015)</i>	

The 2015 Growth Report also drew attention to the fact that persistent real economy-related problems may also be the causes of the crisis. *Table 3* summarises the possible causes and the targeted measures suitable for addressing them.

Table 3	
Fiscal reaction to persistent stagnation	
Persistent stagnation	Permanent fiscal reforms
possible real economy-related causes: <ul style="list-style-type: none"> – adverse demography – insufficient innovation – reduced investment – the weight of less productive services sector increases – the weight of salaries and wages decrease, inequalities increase 	possible fiscal measures: <ul style="list-style-type: none"> – family benefits, labour market measures – public intervention, support – support for public investments and private investments – education – income re-distribution
<i>Source: Based on MNB (2015)</i>	

As part of the coordination, the EU Macroeconomic Imbalance Procedure (MIP) addresses, *inter alia*, the position of sectors and the problematic extent of trade surpluses (EC 2016). However, in order to explore the reasons, they look beyond mere identities in their analyses, thus making, for example, a distinction between Germany and Sweden.²⁰

At the euro area level, reducing the natural rate of inflation is a common challenge with the same causes and consequences, which also requires coordination between countries. As Draghi (2019) puts it, monetary policy takes the natural rate of inflation for granted, and therefore, a low rate may also be raised by fiscal and structural policy. Structural policy can accelerate changes in resource allocation and innovation, which increases TFP. It is the composition of fiscal policy that matters: spending on education and efficient public investment increases productivity, and some measures reduce income inequalities and increase employment. According to estimates, all of this can prevent a decline in the natural rate of inflation (Rachel – Summers 2019). The share of productive expenditure (infrastructure investment, R&D and education) has declined in almost all euro area countries since the crisis (EFB 2019). According to ECB estimates, a coordinated investment expenditure would have six times the spill-over effect on the euro area if the central bank did not raise interest rates in response (Alloza et al. 2019).

Both EU budgetary rules and the Macroeconomic Imbalance Procedure gives a prominent role to stock variables. In the event of a crisis, the problem may arise that there is no room for budgetary manoeuvre in the narrower sense that the debt (and deficit) cannot be increased. In the case of a sustainability problem, there is no possibility for a deficit-increasing, counter-cyclical fiscal policy, and even deficit-reducing measures may be required. However, this is when the importance of the details (targeting/effectiveness) become evident in the most obvious way. According to the most common definition of the room for manoeuvre (Heller 2005), the intended expenditure-increasing or tax-reducing measures cannot be implemented only at the expense of the deficit/debt. Their sources can be tax increases (e.g. tax shift), improving the efficiency of tax collection, reducing low priority expenditures, seigniorage revenues or foreign (e.g. EU) transfers. The case of aggregate stabilisation policy and targeted measures, and within that the balance-neutral reforms, can be contrasted.

One view is that in times of permanently low demand, general demand expansion is a good instrument; due to their costs, it is not worth choosing structural reforms. There is a risk of expansion if debt is high, but this will change in times of more

²⁰ In 2014, there was a significant foreign trade surplus of similar amount in both countries. In Sweden, however, the net international investment position was more balanced than in Germany, and thus in the latter case the current account surplus was classified as a macroeconomic imbalance, in contrast to the former case.

severe crisis. In such cases, it may be true that the inclusion of indebted countries in coordinated expansion within a monetary union has a negative effect on the benefits side, and an even greater negative effect on the costs side, i.e. the cost of excluding them is higher than the cost of their inclusion. It is estimated that, as a result of these two effects, excluding them would reduce the positive annual impact on GDP by two-thirds (*Triggs 2018*). By contrast, structural reforms that reduce inflation may have short-term economic costs during a crisis, as they cannot be offset by monetary policy during times of ZLB (zero lower bound) (*Eggertsson et al. 2014*)

According to another view, during times of persistently low demand, more targeted measures are needed, in a balance-neutral manner, where appropriate, and structural reforms should also be prioritised (*OECD 2016, Boone – Buti 2019*). On the one hand, investment in infrastructure that is in line with the EU fiscal framework (*OECD 2016, Boone – Buti 2019*) can be effective, and on the other hand, growth-enhancing fiscal reforms are needed that can have even short-term positive effects, such as housing subsidies, promotion of job search across regions and professions, or the removal of barriers to entry in the services sector (*OECD 2016, OECD 2019b*).

Finally, countries with little room for manoeuvre in terms of deficits can implement low-cost reforms (*OECD 2016*) or even balance-neutral fiscal measures in a way that these would only change the composition of taxes and the structure of expenditures while keeping the deficit unchanged. This is consistent with the observation that the multiplier of different discretionary measures is very different. Simulations of the French central bank's multi-country DSGE model show that boosting investments with less distortionary taxes raises both short- and long-term growth and thereby improves sustainability. They also found that the spill-over effect of balance-neutral reforms across countries is not large, but if coordinated and monetary policy does not respond, the impact may increase (*Bussière et al. 2017*).

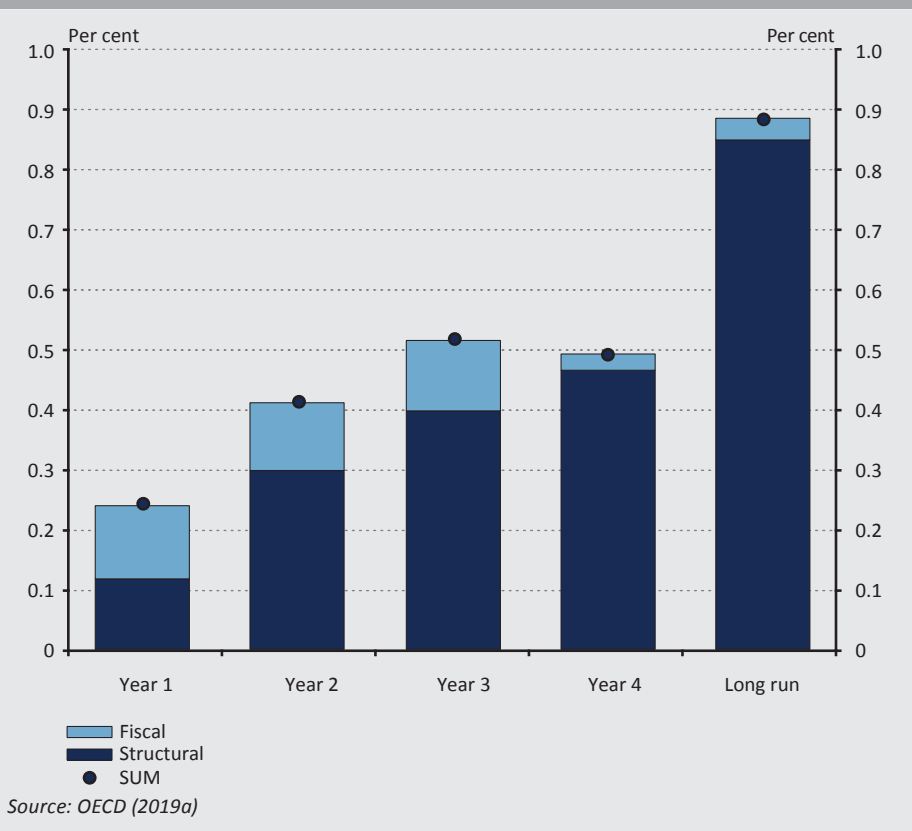
Model calculations are also available for the effect of the balance-neutral Hungarian measures after 2010. The tax reform included a reduction in labour taxes, family tax allowances serving family policy purposes and a tax cut aimed at supporting businesses. By raising consumption taxes and imposing crisis taxes on the financial, retail, telecommunications and energy sectors, taxes were shifted away from production to consumption. The tax cut was partially offset on the expenditure side. Sick pay, early-retirement and disability pensions were reduced. The fact that – instead of unemployment benefits – job opportunities were provided also contributed to the increase in labour market activity.²¹ It is estimated that tax reduction and tax increase measures will have a positive impact on the economy in

²¹ After 2010, the number of employees increased by some 740,000, thus bringing the employment rate close to the EU average.

the longer-term horizon (*Palotai 2017, Baksay – Csomós 2014*). Another simulation, examining larger tax measures and transfer changes (*Szoboszlai et al. 2018*) found that the introduction of a 16 per cent PIT increased effective labour supply by 3 per cent in the long term, largely due to intensive side adjustment and 0.6 per cent to employment increase. As a consequence, the negative budgetary impact could be reduced to one-fifth in the long term. The removal of the super-gross tax base (including employer's contribution) reduced the tax burden to a similar extent. This measure could in the long-term increase employment by 1.5 per cent, and thus the immediate negative impact on the deficit could be reduced to two-thirds in this case. Larger tax and transfer measures between 2008 and 2013 were examined by *Benczúr et al. (2018)*. Between 2008 and 2010, they found that long-term GDP and employment could have increased, but without intensive side adjustment. By contrast, intensive side adjustment may have had a substantial positive effect between 2010 and 2013, but they linked the employment increase more to declining unemployment benefits.

For the euro area as a whole, according to the estimate of OECD, the TFP's contribution to potential growth was 0.2 per cent lower between 2007 and 2017 than in the pre-crisis period. Therefore, measures were proposed that would increase the TFP by 0.2 per cent per year for five years, and thereafter, the 1 per cent higher level would remain constant. *Figure 5* shows how these structural measures and coordinated fiscal policy in the euro area would affect GDP based on the results of the OECD's estimation using the NiGEM model. This shows a deviation from the baseline in terms of level and it is visible that the effectiveness of fiscal policy in the narrow sense is insignificant and temporary compared to structural policy (*OECD 2019: Box 1.4.*).

Figure 5
Impact of structural measures and coordinated fiscal policy on GDP



8. Conclusions

Previously, the two pillars of economic policy were considered to be monetary policy with traditional instruments and aggregate fiscal demand increase. After the crisis, not only the scope of monetary policy instruments expanded, but new pillars also emerged, and not only at the national level but also in the scope of coordination within the EU and the euro area. In addition to the function of stabilisation, there is also a need to increase potential economic growth and the efficiency of the single market. All of these objectives can be supported in addition to targeted fiscal measures by structural and competitiveness reforms, as well as macro- and micro-prudential instruments. As part of the EU's Macroeconomic Imbalance Procedure, aspects requiring targeted reforms have also emerged, such as the prevention of real estate bubbles and the early detection of declining competitiveness, rising private and public debt and investment gaps.

In the case of a monetary union, national fiscal policy (general demand-stimulus or targeted measures) can stabilise Member States' economies, as there is no room for exchange rate adjustment and the adjustment of relative prices is slow. The effectiveness of fiscal policy with stabilisation purposes is strongly undermined by the fact that the estimation of the output gap in real time, i.e. when decisions are made, differed substantially from what appeared later in the light of the incoming data. We have shown that, as a consequence of the revision, a change in the sign of the output gap may have caused a problem for half of the EU Member States between 2000 and 2003, i.e. a fiscal policy meant to be counter-cyclical may have turned out to be pro-cyclical.

We have shown by simulation that a prolonged and large-scale fiscal expansion in general demand, despite the short-term benefits, can be costly, i.e. it may increase the debt ratio, assuming either weak Keynesian or neoclassical multipliers. In a specific situation (hysteresis), permanently higher multipliers may occur, however, even their extremes are insufficient to ensure that expansion does not substantially increase the debt ratio, i.e. self-financing is also not possible with higher GDP. In this sense, we can state that in the case of lasting and major problems, a general demand impulse is not a panacea. According to the OECD simulations, an alternative to this, namely structural reform, is a more appropriate instrument for a sustained increase in GDP, i.e. it may be less costly. Similar results were obtained in simulations processing the Hungarian experience of targeted measures.

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The Effect of Investor Short-Termism on the Capital Demand of European Listed Firms*

Zoltán Schepp – József Ulbert – Ákos Tóth-Pajor

The study examines the relationship between investors' intertemporal preferences and capital demand in European listed firms' practices. It seeks to find out how investor short-termism influenced European companies' capital demand in 2004–2016. The analysis of the link between the cost of equity and businesses' capital demand reveals the effects of macro-level shocks such as the recession, the change in the interest rate environment and the shifting equity risk premium on capital markets. To answer the question that our research focused on, we estimated the implicit intertemporal discount surplus typical of the companies under review and thus determined the discount rate in excess of the cost of capital that describes investors' intertemporal preferences. We then explored the relationship between the cost of equity and capital demand using regression models. We found that in the practices of European listed firms, the decrease in capital demand and the resulting restrictions on investment are attributable to growth in the intertemporal discount surplus. If investors prioritise their short-term interests on the capital markets and companies adapt to investors' intertemporal preferences, long-run shareholder value accumulation is undermined. Additionally, and in connection with the above, growth in the intertemporal discount surplus can also delay the effects of monetary easing.

Journal of Economic Literature (JEL) codes: G31, E22, E52

Keywords: capital demand, investment decisions, intertemporal preferences, intertemporal discount surplus, hyperbolic discounting, investor short-termism

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

Zoltán Schepp is a Professor at the University of Pécs, Faculty of Business and Economics.

Email: schepp@tkk.pte.hu

József Ulbert is an Associate Professor at the University of Pécs, Faculty of Business and Economics.

Email: ulbert@tkk.pte.hu

Ákos Tóth-Pajor is an Assistant Lecturer at the University of Pécs, Faculty of Business and Economics.

Email: toth-pajor.akos@tkk.pte.hu

The study was financed by the Higher Education Institutional Excellence Programme of the Hungarian Ministry of Human Capacities, under the 4th Thematic Programme 'Enhancing the Role of Domestic Companies in the Reindustrialisation of Hungary' of the University of Pécs (Contract No.: 20765-3/2018/FEKUTSTRAT).

The Hungarian manuscript was received on 5 March 2020.

DOI: <http://doi.org/10.33893/FER.19.2.88106>

1. Introduction

The study aims to analyse the impact of investor short-termism on corporate capital demand in the practices of European listed firms. It examines how the changes in the interest rate environment and capital market trends influenced investors' intertemporal preferences and what changes were thus triggered in European companies' capital demand in 2004–2016.

Companies' capital demand can be interpreted as the aggregate outlay for the investments they implement. Consequently, capital demand is shaped by businesses' investment decisions. Investors' intertemporal preferences influence companies' investment decisions through the cost of capital channel, and therefore they also have an indirect effect on firms' capital demand.

In the equilibrium baseline model of asset pricing, i.e. the capital asset pricing model, the cost of equity is determined by the risk-free rate, companies' market risk and development of the equity risk premium. The cost of equity helps track the effects of interest rate movements and capital market developments, which respond to the changes in companies' macro-environment.

The study builds on the model framework used by *Blundell-Wignall – Roulet (2013)* to describe the relationship between companies' capital demand and the cost of equity, and expands it with the intertemporal discount surplus, defined based on *Davies et al. (2014)* and *Miles (1993)*, which describes the implicit intertemporal preferences of capital market investors. In contrast to *Davies et al. (2014)*, the asset pricing model used in this paper does not use a fixed risk premium, so the equity risk premium can change. Here, the amount of the intertemporal discount surplus is shaped by the shifts in the interest rate environment as well as capital market developments.

The study finds that the rise in the implicit intertemporal discount surplus foreshadows a decrease in companies' capital demand and thus can also delay the capital demand-increasing effect of monetary easing.

The paper first provides an overview of the literature on the relationship between investors' intertemporal preferences and capital demand. We then formulate the empirically verifiable research questions that are deemed important based on the literature. Next, we briefly describe our sample as well as the related descriptive statistics. After that, we present the methods used to answer our research questions and assess the findings linked to each of them. Finally, we draw the conclusions based on the results.

2. Intertemporal preferences of capital market investors

Blundell-Wignall – Roulet (2013), *Campbell et al. (2012)* and *Simmons-Süer (2016)* demonstrate that there is an inverse relationship between shareholders' required rate of return and companies' capital demand. If the cost of equity increases, it implies a contraction in companies' capital demand. Examining the relationship between production volume and organisational learning, *Vörös (2020)* argues that in discrete cases an increase in the required rate of return decreases the present value of the production knowledge arising from the larger production volume, and therefore firms opt for a lower production volume in the context of a high discount rate and a higher production volume in the case of a low discount rate. Therefore, on the basis of the basic tenet of neoclassical investment theory, assuming a positive correlation between production volume and capital demand, companies' capital demand will decline against the backdrop of a higher required rate of return.

Fazzari et al. (1988) show that businesses that pay low dividends reinvest their profits because for them external borrowing is more costly than tapping internal sources of financing. The growing difference observed between the costs of equity and interest-paying debt encourages distributions to shareholders. *Mankins et al. (2017)* prove that while capital was a scarce resource in the 1980s and 1990s, nowadays abundant and cheap capital is looking for profitable investment opportunities. The hurdle rates determined by decision-makers do not reflect the cost of capital, which often leads to the rejection of investments.

According to *Simmons-Süer (2018)*, there are periods at listed companies when their low capital demand is attributable to neither the interest rate environment nor growth opportunities. In such periods, the required rate of return does not reflect the cost of capital, which contradicts the irrelevance hypothesis by Miller–Modigliani. *Davies et al. (2014)* demonstrate that investor short-termism on capital markets can lead to a decrease in investments through the cost of capital channel. A negative relationship between the cost of equity and investment can be observed, and thus an increase in shareholders' required rate of return entails a decline in the growth rate of the capital stock.

First *Miles (1993)* and then *Davies et al. (2014)* found evidence for investor short-termism on capital markets, and they showed that the myopic investor approach destroys shareholder value in the long run. If listed firms serve investors' short-term interests on capital markets, they focus on quarterly reports and favour distributions to shareholders, thereby increasing the short-term returns from investments. *Stein (1989)* argues that managers prefer investments that boost profitability in the short run. The market responds to these immediately and incorporates them into the prices. Due to investor short-termism, the equilibrium between short- and long-term

interests is undermined (Martin 2015; Summers 2017; Favaro 2014; Mauboussin – Rappaport 2016).

Asker et al. (2014) maintain that investor short-termism is much stronger in the case of listed companies than private ones. Feldman et al. (2018) write that capital markets facilitate uncollateralised investments in research and development. Hackbarth et al. (2018) believe that if businesses serve investors' short-term interest, long-term value creation costs more. Shareholders are looking to balance short- and long-term cash flows.

Consequently, the literature clearly argues that, assuming a constant discount rate, the rules of exponential discounting often fail to capture intertemporal preferences involved in making decisions. The non-stationary nature of intertemporal preferences and their time inconsistency can be taken into account with time-varying discount rates or using the tools offered by hyperbolic discounting (Janssens et al. 2017). Therefore, this paper uses hyperbolic discounting to examine investors' intertemporal preferences and model intertemporal decisions, which facilitates the incorporation of the effects of short-termism into the study.

Phelps and Pollack (1968) first used this method to model intertemporal decisions across generations, and demonstrated that when making decisions, people assign greater significance to the welfare of their own generation than that of future generations. Laibson (1997) argues that when making decisions, people constrain their own future choices if they give larger prominence to short-term outcomes. Rasmusen (2008) writes that the main point of hyperbolic discounting is the relative treatment of time, and the author deduces the marginal rate of substitution in the case of the various functional forms. Bölcseki (2009) also points out that intertemporal preferences are often biased towards the present. Decisions are taken focusing on short-term interests. Neszveda – Dezső (2012) also argue that hyperbolic discounting is better suited for describing intertemporal preferences. Davies et al. (2014) and Miles (1993) also used similar discount functions to model the intertemporal preferences of capital market investors.

Following in the footsteps of Davies et al. (2014), investors' intertemporal preferences can be modelled using quasi-hyperbolic discount functions. The authors decided to use hyperbolic discounting to present investor short-termism. Intertemporal preferences appear in the discount function as an intertemporal discount factor, denoted by x in equation (1). The intertemporal discount surplus can be interpreted as an additional discount rate describing intertemporal preferences, and therefore the x intertemporal discount factor is the function of the intertemporal discount surplus.

If $x < 1$, that indicates short-termism, because decisions are made while assigning greater significance to short-term cash flows and setting greater required returns than the cost of capital.

If $x > 1$, that indicates a long-term approach, because decisions are made while assigning greater significance to long-term cash flows and setting lower required returns than the cost of capital.

$$D_I(T) = \frac{x^T}{(1+r)^T}, \quad (1)$$

where $D_I(T)$ denotes the discount function describing the intertemporal preferences of the decision maker, r stands for the cost of capital, T is the maturity and x is the intertemporal discount factor.

Davies et al. (2014) also manage to empirically prove short-termism in intertemporal capital allocation decisions. According to *Davies et al. (2014)*, who examined the capital markets of the UK and the US in 1995–2004, the intertemporal discount factor is $x = 0.938$. Therefore, the intertemporal discount surplus can be determined based on equation (2).

$$itp = x^{-1} - 1, \quad (2)$$

where *itp* is the discount surplus describing intertemporal preferences.

Based on equation (2), the average implicit intertemporal discount surplus was 6.6 per cent between 1995 and 2004. This was the return expected by investors in excess of companies' cost of capital.

Davies et al. (2014) also demonstrate that investor short-termism shifts companies' allocation of capital towards distributions to shareholders rather than investments. These observations have proven that the intertemporal preferences of decision makers on capital markets are non-stationary; investors focus on short-term interests during their intertemporal capital allocation decisions, which decreases corporate investment through the cost of capital channel. The examination of the relationship between implicit intertemporal preferences and capital demand highlights new aspects in the studies analysing the causality between the required rate of return and investments.

After reviewing the literature, the focus will now be shifted towards two empirically verifiable research questions. First, it will be examined how the intertemporal discount surplus changed in 2004–2016. Second, it will be explored how this change affected companies' capital demand and how it influenced the economic stimulus provided by monetary policy measures. The following hypotheses are formulated based on our preliminary expectations:

1. The intertemporal discount surplus increased in the period under review (2004–2016).
2. Its increase overshadowed long-run shareholder value accumulation by restricting investments and thus probably also delayed the capital demand-boosting effects of monetary easing.

3. Sample and descriptive statistics

The financial statement data necessary for calculating the key variables for 2004–2017 were compiled from the database of *Refinitiv*. The resulting panel database contains the balance sheet, income statement and cash flow statement data of listed firms registered in Europe. Besides the financial statement data, the dataset also contains market information. The available data allowed for the estimation of the intertemporal discount surplus in 2004–2016, and thus the descriptive statistics are also presented for this period.

Sample selection criteria:

- companies with negative equity were excluded from the sample;
- companies with zero sales revenue were excluded from the sample;
- only those listed firms were permitted in the sample which were listed on the stock exchange during the entire sample period;
- the corporate financial statement data and market information from 27 countries are presented in euros based on the calculations of Refinitiv;
- the financial sector, public services and the real estate sector were excluded from the sample in line with the Global Industry Classification Standard (GICS), due to the variation in accounting regulations; therefore, companies from 55 different industries are included.

The dataset that serves as the basis for the empirical study comprises firms that have been publicly listed for 30 years on average, and thus the sample allows for the examination of mature listed companies. The Refinitiv database contained 2,984 listed firms registered in Europe where the information necessary for calculating the key variables was available. After filtering by the selection criteria, the study analysed a total of 14 financial years with the 527 listed firms that remained in the sample. This represents 17.66 per cent of the available companies.

In terms of the key variables, outliers were filtered out with the interquartile range method. If the given values of a variable were further away from the 25th and 75th percentile than three times the interquartile range, they were replaced

with the values at the 5th and 95th percentile (*Hastings et al. 1947; Dixon 1960; Tukey 1977*). The sample appropriately represents the capital markets of Europe and is thus suitable for examining the relationship between capital demand and intertemporal preferences.

Table 1 shows the calculation method used for the variables in the models analysing the link between corporate capital demand and the cost of equity and in estimating the implicit intertemporal discount surplus. Capital demand (I) is determined by capital expenditures ($CAPEX$), which is defined as the sum of the investments in tangible and intangible assets in the cash flow statements of listed firms. Therefore, capital demand can be construed as the spending on investment in tangible and intangible assets.

Similar to *Blundell-Wignall – Roulet (2013)*, we analysed capital demand relative to sales revenue (S) to enable the comparison of companies of different sizes.

Table 1		
Definitions of key variables		
Variable	Notation	Calculation method
Capital demand relative to sales revenue	$I_{i,t}/S_{i,t}$	Capital expenditures ($CAPEX$) $_{i,t}$ / Net sales revenue $_{i,t}$
Capital intensity	$K_{i,t}/S_{i,t}$	(Intangible assets $_{i,t}$ + Tangible assets $_{i,t}$) / Net sales revenue $_{i,t}$
Cost of equity	$COE_{i,t}$	$r_{ft} + \beta_i ERP_{i,t}$
	r_{ft}	10-year ECB zero-coupon yield
	β_i	CAPM Beta (Refinitiv estimate)
	$ERP_{i,t}$	Equity risk premium
Dividend per share (EUR)	$DPS_{i,t}$	Dividend paid $_{i,t}$ / Number of shares $_{i,t}$
Earnings per share (EUR)	$EPS_{i,t}$	Profits after tax $_{i,t}$ / Number of shares $_{i,t}$

The targeted long-term capital stock necessary for operations is determined by companies' output. In the long run, businesses' output and capital stock are in line with each other, and this is referred to as capital intensity. It measures the amount of capital necessary in a firm to produce one unit of sales revenue (S). Capital intensity determines the targeted long-term capital stock necessary for operations. The capital stock (K) is defined as the sum of intangible and tangible assets. The cost of equity (COE) is defined as the sum of the 10-year ECB zero-coupon yield (r_f) and the risk premium characteristic of the companies. The 10-year ECB zero-coupon yield was chosen because the sample largely comprises euro area countries, and

the ECB zero-coupon yield accurately represents the risk-free rate of the countries in the sample.

We determined the risk premium as the product of the implied equity risk premium (ERP) based on the work of Damodaran (2019), observed in the country where the company is registered on the one hand, and the market risk characteristic of the company (β_i) on the other hand. We measured market risk by the betas estimated by Refinitiv. As per the definition, the change in the cost of equity is entailed by the variation in the interest rate environment and the equity risk premium. The intensity of the comovement between stock returns and the market return was assumed to be constant in the sample period. Therefore, the changes in the cost of equity help track the effects of macro-level shocks.

Stock price (P), earnings per share (EPS) and dividends per share (DPS) are presented in euros. Financial years are indexed with t , companies with i .

Table 2						
Descriptive statistics of the key variables based on the entire sample						
Variable	Average	Standard deviation	Minimum	Median	Maximum	Number of observations
$I_{i,t}/S_{i,t}$	0.058	0.052	0	0.041	0.224	6,851
$K_{i,t}/S_{i,t}$	0.353	0.316	0.005	0.247	1.317	6,851
$COE_{i,t}$	0.077	0.024	0.004	0.076	0.184	6,851
$r_{i,t}$	0.032	0.012	0.009	0.037	0.044	6,851
β_i	0.81	0.392	-0.082	0.809	2.312	6,851
$ERP_{i,t}$	0.056	0.011	0.045	0.05	0.2	6,851
$DPS_{i,t}$	0.578	0.809	0	0.263	4.077	6,851
$EPS_{i,t}$	1.221	1.9	-4.97	0.569	9.699	6,851
$P_{i,t}$	22.451	30.288	0.01	10.54	170.309	6,851

Table 2 shows the descriptive statistics of the key variables based on the entire sample. In 2004–2016, companies expanded their capital stock relative to sales revenue by 5.8 per cent on average annually. In terms of capital intensity, the generation of one unit of sales revenue required 0.353 units of capital. The beta, measuring market risk, was 0.81 on average. The cost of equity fluctuated around 7.7 per cent, while the equity risk premium was 5.6 per cent on average.

Average earnings per share were EUR 1.22, the average dividend per share was EUR 0.578, and the average 10-year ECB zero-coupon yield was 3.2 per cent in the financial years under review.

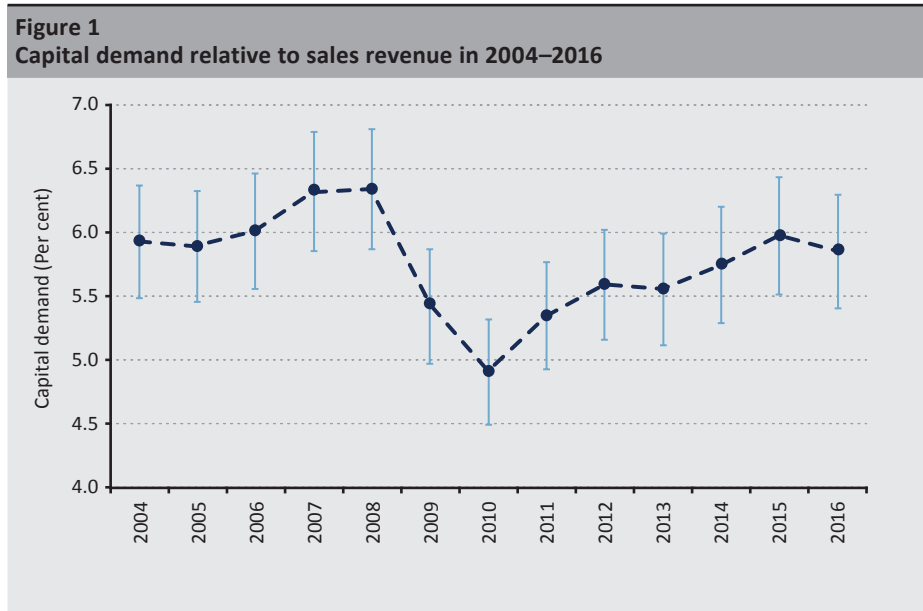
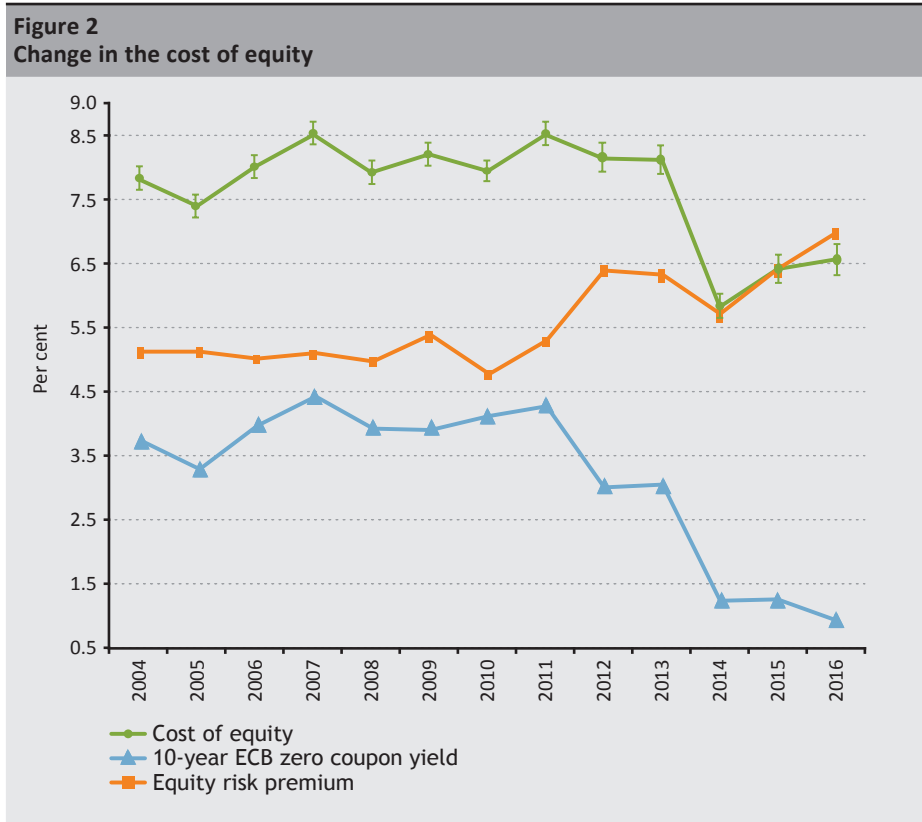


Figure 1 shows the development of average capital demand relative to sales revenue, broken down by financial years, in the sample period. While in 2007 companies increased their capital stock by 6.3 per cent on average, the investment rate dropped to under 5 per cent during the crisis years, before climbing back to 5.8 per cent in the low interest rate environment by 2016. *Duchin et al. (2010)* argue that the decline in investments was the result of the shock to the external capital supply on account of the crisis. The 2009–2010 investment shock entailed a massive reduction in the growth rate of the capital stock.

When analysing intertemporal preferences, important information can be gained from the trends in risk-free returns and the equity risk premium, as well as the change in the cost of equity. *Figure 2* clearly shows that the sampled average 10-year ECB zero-coupon yield varied in the range of 3–4.5 per cent until 2011. After the 2011 financial year, as the euro area debt crisis receded, the 10-year ECB zero-coupon yield declined. The analysis of the implied equity risk premium estimated based on *Damodaran (2019)* and observed on the capital markets broken down by the firms' country of incorporation shows that the sampled average of the equity risk premium rose from 5 to 7 per cent after the crisis. Due to the combined impact

of the risk-free rate and the equity risk premium, the sampled average of the cost of equity only diminished by 2014. *Figure 2* provides a good overview of the effects exerted by the changes in the interest rate environment and capital market developments on the cost of equity of European listed firms.



4. Changes in the intertemporal discount surplus in 2004–2016

The implicit intertemporal discount surplus is estimated based on *Davies et al. (2014)*. The authors use quasi-hyperbolic discount functions in an asset pricing model to estimate the intertemporal discount surplus. Thus, the asset pricing model used in their estimations includes an additional discount factor describing intertemporal preferences.

The asset pricing model used here differs from the one employed by *Davies et al. (2014)* in that, with regard to the cost of equity, we defined the risk premium as the product of the implied equity risk premium and the beta. This definition of the

cost of equity is based on the capital asset pricing model (CAPM). We assumed that the comovement between the market return and stock returns is constant in the sample period. Consequently, in contrast to *Davies et al. (2014)*, here the cost of equity is derived not only from the interest rate changes but also from the time-varying risk premium, and the heterogeneity between companies is only influenced by market risk. Unlike in *Davies et al. (2014)*, the risk premium may vary in the sample period in the asset pricing model used here, and therefore the intertemporal discount surplus is shaped by the shifts in the interest rate environment as well as capital market developments. Based on *Davies et al. (2014)*, the asset pricing model used for estimating intertemporal preferences can be established with the help of equation (3):

$$P_{i,t} = \sum_{j=1}^N \frac{E_t(DPS_{i,t+j})x_t^j}{(1 + COE_{i,t+j})^j} + \frac{E_t(P_{i,t+N})x_t^N}{(1 + COE_{i,t+N})^N}, \quad (3)$$

where i is used to index companies, j is used to index the years of the holding period, and t is the index for financial years, $P_{i,t}$ denotes the share price, N stands for the holding period, $DPS_{i,t}$ is the dividend per share, $COE_{i,t} = r_{ft} + \beta_i ERP_{i,t}$ is the cost of equity, and x_t denotes the implicit intertemporal discount factor for the given year.

Wickens (1982) argues that the expected values for equation (3) are identical to the difference between the realised values and the forecast error. In this case, the expected value of the share price N periods later at time t can be determined by equation (4).

$$E_t(P_{i,t+N}) = P_{i,t+N} - U_{i,t+N}, \quad (4)$$

where $U_{i,t+N}$ denotes the forecast error.

Here, the parameter x can be estimated with instrumental variables estimation methods where the instrumental variables correlate with the $P_{i,t+N}$ share price but not with the forecast error. Therefore, the parameter x in equation (3) can be estimated using the non-linear two-stage least squares method. In the case of future dividends per share and future share prices, the lagged earnings per share and dividends per share can be used as instrumental variables. Thus, the x intertemporal discount factor can be estimated for all financial years to track changes in investors' intertemporal preferences on the capital markets. *Neszveda – Dezső (2012)* argue that in the long run quasi-hyperbolic discount functions produce markedly different results than generalised hyperbolic discounting. Accordingly, the model developed here used an N holding period of 5 years, except when there were not enough observations for the 5-year period. Therefore, the holding period was shortened by one year in each year after 2012. Thus, the model examines a medium-term

investment horizon. The intertemporal discount surplus cannot be estimated based on the data available for the 2017 financial year.

Figure 3 tracks the development of the implicit intertemporal discount surplus in 2004–2016. First, we estimated the x intertemporal discount factor using the asset pricing model presented in equation (3) and then we expressed the implicit intertemporal discount surplus from that based on the formula in equation (2). Due to the forecast errors, we estimated the parameter x using the non-linear two-stage least squares method for each financial year.

In the case of cross-sectional regressions, the R^2 varies between 72 and 95 per cent. The estimated intertemporal discount factor is significant at 1 per cent in every year. Following the parameter estimation, the *Wald test* was used to examine whether the intertemporal discount factor significantly differed from 1, since if $x = 1$, then the implicit intertemporal discount surplus is 0. The results of the *Wald tests* showed significant differences in all years. Based on Hansen's J-statistics, the null hypothesis, according to which the set of instrumental variables was appropriate, was never rejected. Figure 3 shows point estimates as well as the 95 per cent confidence interval calculated from the standard errors taking into account heteroscedasticity based on *White (1980)*.

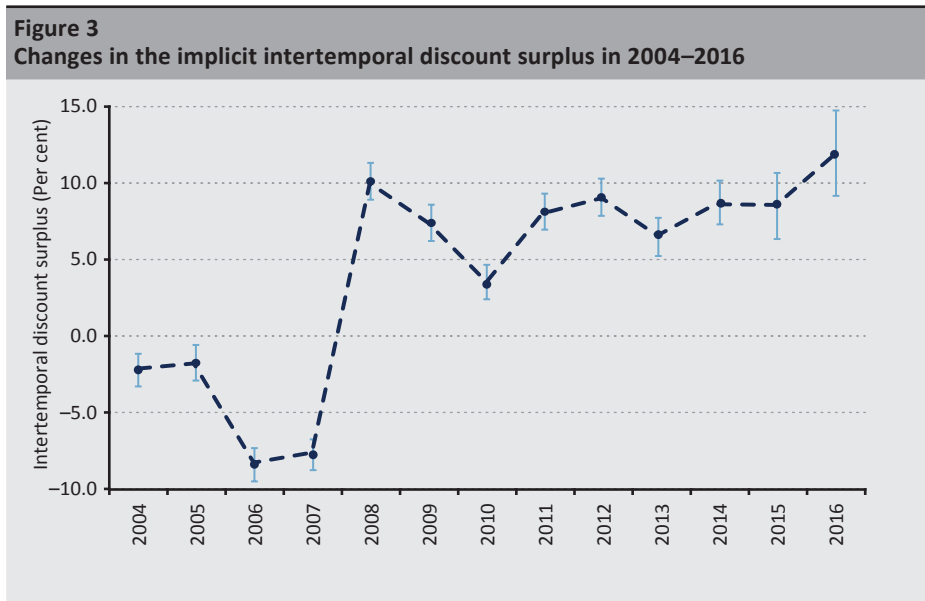


Figure 3 demonstrates that the implicit intertemporal discount surplus was negative before 2008. Accordingly, investors' average required rate of return on the capital market was below the cost of equity. This suggests that investors were characterised by a long-term approach before 2008: they were more likely to forego their present income for the promise of future returns. The largest negative intertemporal discount surplus was seen in 2006, when investors' average required rate of return was 8.4 per cent lower than the cost of equity. The intertemporal discount surplus has been positive since 2008, which indicates that investors' average required rate of return moved above the cost of equity. In such a situation, investors focus on their short-term interests on the capital markets, and therefore they are less inclined to make a trade-off between their present income and the promise of future returns. In 2008, the intertemporal discount surplus was 10.1 per cent, i.e. investors' average required rate of return on the capital markets exceeded the cost of equity by this percentage.

5. The effect of investor short-termism on the capital demand of European listed firms

Investors' required rate of return also affects companies' capital demand through the cost of capital channel, since – from the perspective of firms – the investors' required rate of return can also be seen as the cost of equity. An increase in the implicit intertemporal discount surplus may boost the discount rate used during investment decisions and thus decrease companies' capital demand.

After estimating the intertemporal discount surplus, we analysed the effects of intertemporal preferences on capital demand. *Blundell-Wignall – Roulet (2013)* argue that there is an inverse relationship between the required rate of return and companies' capital demand. They also show that there is a negative relationship between the cost of equity and capital demand. The cost of equity is a good point of reference as regards the required rate of return, but when making investment decisions, decision makers usually use different hurdle rates, which is not captured very well by using the cost of equity. That is why the examination of the implicit intertemporal discount surplus is considered important here, because it captures the difference between the hurdle rates and the cost of equity.

In analysing the impact of the growth in intertemporal discount surplus, a model similar to the one employed by *Blundell-Wignall – Roulet (2013)* is used here, which has been expanded by taking into account the effects of the implicit intertemporal discount surplus and the intertemporal discount factor. With the help of our model we can capture investors' required rate of return in a more precise way.

The baseline model is presented in equation (5).

$$\frac{I_{i,t}}{S_{i,t}} = \beta_1 COE_{i,t-1} + \beta_2 \frac{K_{i,t}}{S_{i,t}} + \mu_i + \varepsilon_{i,t}, \quad (5)$$

where $I_{i,t}/S_{i,t}$ is the capital demand for a unit of sales revenue, $COE_{i,t-1}$ is the cost of equity, $K_{i,t}/S_{i,t}$ is the capital intensity, μ_i denotes fixed effects, $\varepsilon_{i,t}$ is the error term, and β stands for the parameters of the regression model.

Further explanatory variables incorporated into the baseline model include the trends of the intertemporal discount factor (x) and the intertemporal discount surplus (itp). We use two different trend variables to show that the model definitely captures the effects of intertemporal preferences, and the trend variables do not merely reflect the passage of time. The preliminary expectations include that a positive relationship will be observed between capital demand and the trend of the discount factor, and a negative one in the case of the intertemporal discount surplus. The models incorporate the lagged trend variables, because we seek to analyse the predictive features of these trend variables.

In equation (6), we expanded the model with the trend of the intertemporal discount factor.

$$\frac{I_{i,t}}{S_{i,t}} = \beta_1 x_{t-1} + \beta_2 COE_{i,t-1} + \beta_3 \frac{K_{i,t}}{S_{i,t}} + \mu_i + \varepsilon_{i,t}, \quad (6)$$

where x_{t-1} denotes the lagged trend of the intertemporal discount factor.

Equation (7) incorporates the trend of the discount surplus describing implicit intertemporal preferences as an explanatory variable.

$$\frac{I_{i,t}}{S_{i,t}} = \beta_1 itp_{t-1} + \beta_2 COE_{i,t-1} + \beta_3 \frac{K_{i,t}}{S_{i,t}} + \mu_i + \varepsilon_{i,t}, \quad (7)$$

where itp_{t-1} denotes the lagged trend of the discount surplus describing intertemporal preferences.

The models aim to demonstrate that growth in the intertemporal discount surplus reduces firms' capital demand, which suggests that investor short-termism entails the rejection or postponement of investment through the cost of capital channel, thereby destroying value for companies. Investor short-termism undermines long-run shareholder value accumulation.

Table 3 examines the link between the required rate of return and capital demand. The data necessary for the estimation were available for 527 companies in the sample under review, and we could analyse 12 financial years due to the time lags. We estimated the models using 'within' transformation. The table shows the

Newey–West standard errors. Model C1 was estimated based on equation (5), C2 was based on equation (6), while C3 was estimated from equation (7).

Model C1 shows that a 1 per cent increase in the cost of equity cuts companies' capital demand by 0.1 per cent. This demonstrates the inverse relationship between capital demand and the cost of equity. Unsurprisingly, the growth in capital intensity lifts capital demand. In Model C2, the variable x_{t-1} denotes the trend of the intertemporal discount factor. While before 2009 the value of x_{t-1} is over 1, in 2009 it dips below 1, which shows the emergence of investor short-termism. The positive parameter related to the trend of the intertemporal discount factor suggests that investor short-termism foreshadows a drop in companies' capital demand.

Model C3 arrives at the same conclusions, when the model is expanded with the lagged trend of the intertemporal discount surplus. The negative parameter of the variable itp_{t-1} suggests that the increase in the intertemporal discount surplus reduced firms' capital demand through the cost of capital channel. A 1 per cent growth in the intertemporal discount surplus cuts capital demand by 0.048 per cent.

Table 3			
Relationship between the required rate of return and capital demand			
$I_{i,t} / S_{i,t}$	C1	C2	C3
x_{t-1}		0.049*** (0.006)	
itp_{t-1}			-0.048*** (0.005)
$COE_{i,t-1}$	-0.100*** (0.038)	-0.187*** (0.038)	-0.186*** (0.038)
$K_{i,t} / S_{i,t}$	0.092*** (0.006)	0.092*** (0.006)	0.092*** (0.006)
R^2	0.118	0.131	0.131
Adjusted R^2	0.037	0.052	0.052
Wooldridge test: p-value	0.000	0.000	0.000
Number of observations	6,324	6,324	6,324
Number of firms	527	527	527
Number of financial years	12	12	12
<i>Note: Standard errors are shown in brackets. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.</i>			

The examination of the relationship between intertemporal preferences and capital demand clearly shows that a rise in the implicit intertemporal discount surplus reduces capital demand through the cost of capital channel. Investor short-termism

entails the rejection or postponement of investments with positive net present value and thus destroys shareholder value.

The models also indicate that a decrease in the cost of equity heralds a rise in capital demand. As *Figure 2* showed, in the aftermath of the 2009 investment shock, the impact of monetary easing only reduced the cost of equity considerably by 2014, even though interest rate cuts started in 2011 as the euro area debt crisis ebbed. This suggests that capital market developments following the crisis probably delayed the investment-boosting effect of the monetary policy measures aimed at crisis management. Moreover, the rising intertemporal discount surplus also ran counter to monetary easing.

6. Conclusions

The paper has shown that the implicit intertemporal discount surplus increased in 2004–2016. Before 2008, the intertemporal discount factor was over 1 and then it dropped below 1. While investors were characterised by a long-term approach prior to 2008, they switched to short-termism in the aftermath of the crisis. The difference between investors' required rate of return and the cost of capital widened. After the crisis, investors were less inclined to make a trade-off between their present income and future promised returns. If the implicit intertemporal discount surplus is incorporated into companies' cost of capital, capital demand is reduced and investments with a positive net present value are rejected or postponed. This overshadows long-run shareholder value accumulation by restricting investments. The analysis of the link between the cost of equity and capital demand reveals the effects of macro-level shocks such as the recession, the change in the interest rate environment or the shifting equity risk premium on capital markets. The sample under review shows a major drop in the cost of equity in 2014, attributable to the falling interest rates and the change in the equity risk premium. This suggests that – in view of the changes in the cost of equity and the rise in the intertemporal discount surplus – the capital market developments following the crisis probably delayed the capital demand-boosting effect of monetary easing.

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An Estimation of the Magnitude and Spatial Distribution of Usury Lending*

Nedim Márton El-Meouch – Zita Fellner – Anna Marosi – Beáta Szabó – Ákos Urbán

In parallel with financial deepening, attention is increasingly being paid to the segment of the population that is not involved in formal financial intermediation. Some of these households typically have poor income situations, and therefore, due to their low creditworthiness, their demand for credit remains unmet. In our study, for the first time in the Hungarian academic literature, we attempt to estimate the magnitude of the spread of usury lending. Domestic responses to the Eurostat Survey on Income and Living Conditions were used to determine the order-of-magnitude of vulnerable, and thus potentially affected households. Based on our results, the proportion of Hungarian households that – due to their financial and housing conditions – are so vulnerable that they may be exposed, at least on an ad-hoc basis, to the risk of usury lending, can be estimated at between 3 and 13 per cent. In order to identify areas where usury lending is believed to be rife in the local community, we used as a basis the intersection of settlements lagging behind due to their economic-housing underdevelopment and districts with low (formal) credit penetration, based on the aggregate data from the Hungarian Central Statistical Office and the Central Bank of Hungary. The areas most affected by usury lending may be the country border settlements in Borsod-Abaúj-Zemplén, Szabolcs-Szatmár-Bereg and Hajdú-Bihar counties. This result is also supported by the regional distribution of available official statistics on criminal usury.

Journal of Economic Literature (JEL) codes: D14, E26, E51, O17, R20

Keywords: indebtedness, usury, credit demand, financial vulnerability

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

Nedim Márton El-Meouch is an Analyst at the Magyar Nemzeti Bank. E-mail: elmeouchn@mn.b.hu

Zita Fellner is an Economic Analyst at the Magyar Nemzeti Bank. E-mail: fellnerz@mn.b.hu

Anna Marosi is an Analyst at the Magyar Nemzeti Bank. E-mail: marosia@mn.b.hu

Beáta Szabó is an Analyst at the Magyar Nemzeti Bank. E-mail: szabobea@mn.b.hu

Ákos Urbán was an Analyst at the Magyar Nemzeti Bank at the time of writing the study.

E-mail: akosh.urban@gmail.com

The Hungarian manuscript was received 16 December 2019.

DOI: <http://doi.org/10.33893/FER.19.2.107132>

1. Introduction

Following the global financial crisis, borrowing by the domestic household sector hit rock bottom in 2012, but since then we can talk about increasingly expansive credit issuance, which has affected both housing loans and consumer loans. However, the expansion of new loans was long offset by repayments of loans taken out before the crisis, and consequently the nominal credit-to-GDP ratio only began to increase in 2018. As the credit cycle progresses, with the cyclical deepening of financial intermediation, more and more attention is being paid to those segments of the population that are not yet involved in financial intermediation provided by the formal institutional system (i.e. do not use any services of the financial intermediation system).

The strata which are outside the realm of the banking system typically either have low incomes or cannot present verifiable income at all, and are thus not considered creditworthy under the current macroprudential (debt cap) regulations.¹ Their lack of involvement is, on the one hand, a constraint on financial deepening in the long run and, on the other hand, it can cause acute social problems, as they do not enter the scope of either financial supervision or consumer protection. Due to their worse financial status, the demand for external funding for liquidity purpose may be increasingly present among these households, possibly through the use of informal channels. The most common manifestation of this in Hungary is usury lending, which is a short-term debt taken from a private person. It has typically an unrealistically high interest rate compared to credit market conditions.

Since usury lending is a legally prohibited activity, the recognition of its size at the level of the national economy is limited: neither creditors, nor debtors talk about it in surveys for statistical purposes, and “contracts” are not recorded in an accessible way.² Our research, therefore, was focused on examining the population *potentially* exposed to non-bank financial intermediation. Determining the volume of *actual* involvement encountered insurmountable methodological obstacles. For the order-of-magnitude estimation, we used domestic responses to the Eurostat Survey on Income and Living Conditions (EU-SILC). As to the spatial delimitation, the settlement-level data from the Hungarian Central Statistical Office (HCSO) and the district-level data from the Central Credit Information System (CCIS) were used.

The study is structured as follows: In *Section 2*, we present the aggregate data on the basis of which unmet credit demand can be identified in Hungary today, complemented by the main findings of the Hungarian academic literature on usury

¹ For debt cap rules in force, see *Annex 1*.

² The ways of receiving information in which the issue is approached by anthropological methods and fieldwork are also limited; moreover, in the case of these qualitative, local studies, research ethical dilemmas also arise in connection with the publication of the results (*Durst 2017*).

lending and two significant barriers to connection to the banking system: lack of institutional trust and of access to services. This is followed by two sections that present the data and methods used in the research, as well as the results. First, *Section 3* provides an order-of-magnitude estimation of vulnerable households potentially exposed to ad hoc usury lending, and then *Section 4* provides an estimation of the spatial location of widespread usury lending that is rife in the local community. The latter results are validated by crime statistics. Finally, we summarise the main findings as well as the possibilities and limitations of further research.

2. Background – Sources of unmet credit demand based on official statistics and academic literature

According to the information provided by the Hungarian Central Statistical Office (*HCSO 2017*), the establishment of internationally standardised indicators of poverty and, in a broader sense, of social exclusion (*Laeken indicator system*) dates back to the 2000s. In this process, it has become a common view that, in addition to income, dimensions of exclusion, such as material well-being or the labour market situation, fundamentally determine the quality of life. Based on these, partial indicators capturing the proportion of those at risk of poverty or social exclusion (*AROPE*) are:

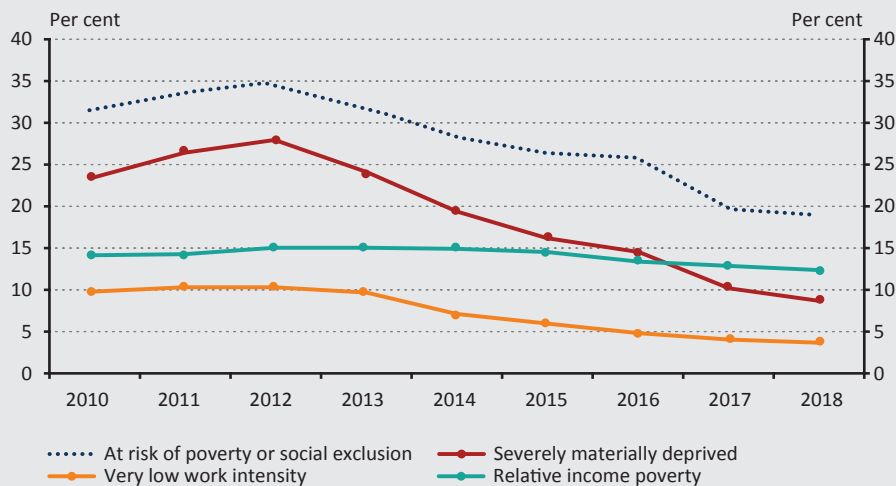
1. proportion of people living in relative income poverty,³
2. proportion of people living in severe material deprivation,⁴
3. proportion of people living in households with very low work intensity (poverty at work).⁵

Based on the latest data for 2018 (*HCSO 2019*), in Hungary, the proportion of the relative income poor is 12 per cent, the proportion of people living in severe material deprivation is 9 per cent and the proportion of households with very low work intensity is 4 per cent – as a result of this, the proportion of those at risk of poverty or social exclusion in Hungary is 19 per cent (*Figure 1*).

³ Relative income poor: those with incomes below the relative poverty line. Relative poverty line: 60 per cent of the median national equivalent net household income in a given year. (In 2018, in the case of a single-person household, HUF 1,120,000 per year, in the case of 2 adults with 2 children, HUF 2,351,000.)

⁴ If at least four of the following nine points are true, then the household can be identified as deprived: 1. cannot afford to face unexpected expenses; 2. incapable to afford paying for one week annual holiday away from home; 3. cannot afford to pay their rent, mortgage or utility bills; 4. cannot afford a meat, chicken or fish meal every other day; 5. cannot afford to keep their home adequately warm. For financial reasons, the household is forced to give up 6. the washing machine, 7. the colour television, 8. the telephone, 9. the car for personal use.

⁵ Very low work intensity: working-age members of the household spend less than 20 per cent of their potential working time at work.

Figure 1**Share of population at risk of poverty or social exclusion**

Source: HCSO (2019)

By socio-demographic factors, the *HCSO (2019)* notes that younger people, those with up to primary education, the unemployed, households with children (especially single-parent households), those living in villages, the Roma minority, and, on a territorial basis, the residents of Northern Hungary region are more at risk of poverty or social exclusion.

Those living in severe material deprivation – because of their very poor situation – would obviously seek to end it by increasing their consumption if they had the opportunity to do so. At the same time, households facing borrowing constraints may come from among those characterised by very low work intensity and income poverty, as they may lack sufficient and verifiable income for bank borrowing in this segment. Accordingly, these are the strata which has an unmet credit demand vis-a-vis the formal financial intermediary system, and therefore resort to informal or even illegal interpersonal lending.

2.1. Findings of the academic literature

The patterns of cash management of people living in poverty differ significantly from the behaviour of other social groups, as they have access to other tools, which also necessarily means more limited space for opportunities. According to

Gosztonyi (2018), Frits Bouman⁶ created the context in which the financial transactions of the poor are embedded, which, he believes, are characterised by small-scale approach (low amounts of credit coupled with low incomes, savings), high risk, and strong relationship dependency.

Due to their specific cash management, low-income households are typically weakly connected to the traditional financial intermediation system: they contact informal financial intermediaries when necessary, one of the most significant forms of which is usury. The term usury refers to loans granted on an informal basis for which the debtor has to pay disproportionately high interest. In colloquial usage, it is still described as “money with interest”, referring to the extremely high interest portion of the loan product.

In economically underdeveloped areas, the main source of income for households is social transfers. Unemployment and the number of inactives are typically high. The additional income, which represents 22–24 per cent of their total income, comes from casual work, such as farm work, construction, scrap-iron and wood collection, or fruit and mushroom picking (*Messing – Molnár 2011*). Due to their low income levels, these households are financially extremely vulnerable, and therefore, an unexpected expenditure can jeopardise a family’s livelihood. In this position of vulnerability, they are forced to take out usury loans. On the one hand, these households typically do not have a banking relation, and on the other hand, their family and friends live in similarly difficult conditions, and so in most cases, in the absence of alternative solutions, they choose to take out usury loans.

Seminal foreign authors on the topic, *Collins et al. (2009)*, point out that informal financial intermediation adversely affects clients in several ways compared to the formal institutional system. For example, market liquidity is unpredictable, there is no consumer protection regulation, trade secrets are not taken into account, there is a lack of contractual transparency and, consequently, local norms and trust play a greater (almost exclusive) role than the market.

In most cases, the individuals lending usury are local inhabitants who lend with a maturity of 1–2 months at interest rates of 50–100 per cent. The transaction is not recorded in writing, and aggression is also used above a certain amount (about HUF 50,000) in the collection of claims. The usurer is definitely trying to collect the debt, but does not aim to fully recover his claim. It is important for him to maintain a dependency relationship (*Béres – Lukács, 2008*). Those affected by usury typically live in large families (more than 4 people per household), in poor housing conditions, with poor public utilities and limited access to transportation

⁶ Bouman, F. (1990): *Informal Rural Finance – An Aladdin’s Lamp of Information*. *Sociologia Ruralis*, 30(2): 155–173.

services. They are characterised by low levels of education and persistent, long-term unemployment (*Hüse et al. 2008*).

Usury is typically justified by one-off exceptional expenses (e.g. cost of medicines, home renovation), but it is also common for money to be used to meet basic needs, in which case the usury loan has to be re-borrowed from time to time. In addition, the causes include funding addictions (alcohol, gambling). Seasonality can also be observed in usury lending, namely, much more debt is accumulated in winter, which decreases significantly in summer. This phenomenon is strongly related to casual work opportunities and the heating season (*Gosztonyi 2018*).

In Hungary, the vast majority of usury borrowers are Roma, but several studies show that this is not determined by ethnicity, but rather by the unfavourable situation (*Messing 2006, Béres – Lukács 2008, Messing – Molnár 2011, Gosztonyi 2018*). Poverty, therefore, determines usury, so efforts to eliminate it should potentially focus on eradicating poverty.

The population potentially affected by usury, thus, comes from the poor strata, where acute emergencies often develop. In these cases, fast-access, possibly continuously renewable borrowing plays an important role. This brings us to the question of what causes broad social groups to be excluded from the financial intermediation system. Before income constraints, we briefly examine two factors that explain the lack of banking relations: the willingness and ability constraints of financial inclusion.

2.2. Two potential components in the lack of banking relation: trust and access

In Hungary, about 25 per cent of the population does not have a banking relation, i.e. they do not have a bank account,⁷ and therefore, they cannot make use of the opportunities provided by financial products, interest-bearing savings and credit. There may be a number of reasons behind this, which can be broken down into factors of willingness (trust) and ability (access).

Public trust in the banking system was undermined around the world by the 2008 financial crisis. Nevertheless, according to the World Values Survey's research in 60 countries conducted between 2010 and 2014, more than half of the population in many countries trusts banks. Although Hungary did not participate in this research, significant regional differences can be seen, which can provide an indication of the international positioning of the domestic situation. The highest level of trust characterises the Far East, followed by African and Middle Eastern states, then South America, Australia and the United States and at the end of the row are the European countries participating in the survey (*Figure 2*). Thus, in international comparison,

⁷ Based on 2017 data from the World Bank Global Findex Database.

Hungary is probably one of the countries characterised by low trust in the banking system. Nevertheless, according to a 2019 survey by the Central Bank of Hungary (Magyar Nemzeti Bank, MNB), one quarter of the Hungarian population generally does not trust banks at all (Figure 3).

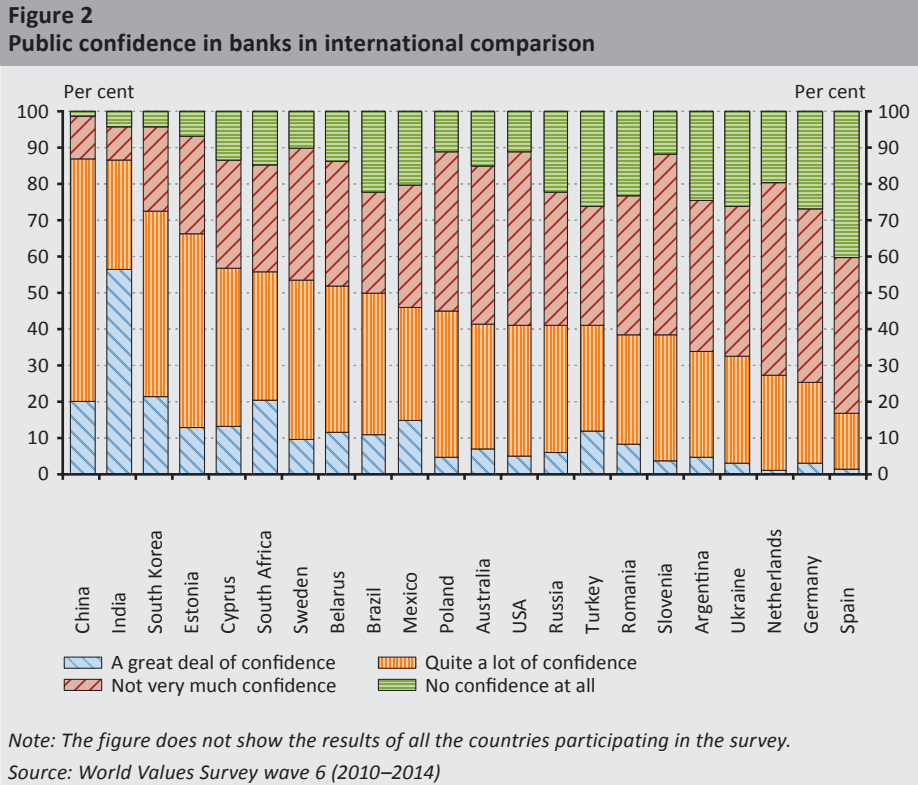
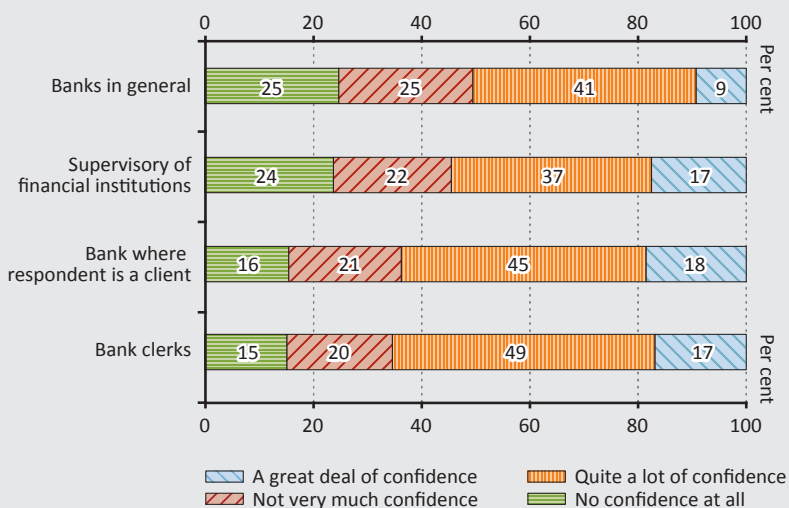


Figure 3
Public confidence in certain actors of the financial system in Hungary



Note: Data were collected in February 2019. Opinion poll by CAPI method, based on a questionnaire survey of 1,000 randomly selected people among the Hungarian adult population.

Source: MNB, Századvég survey

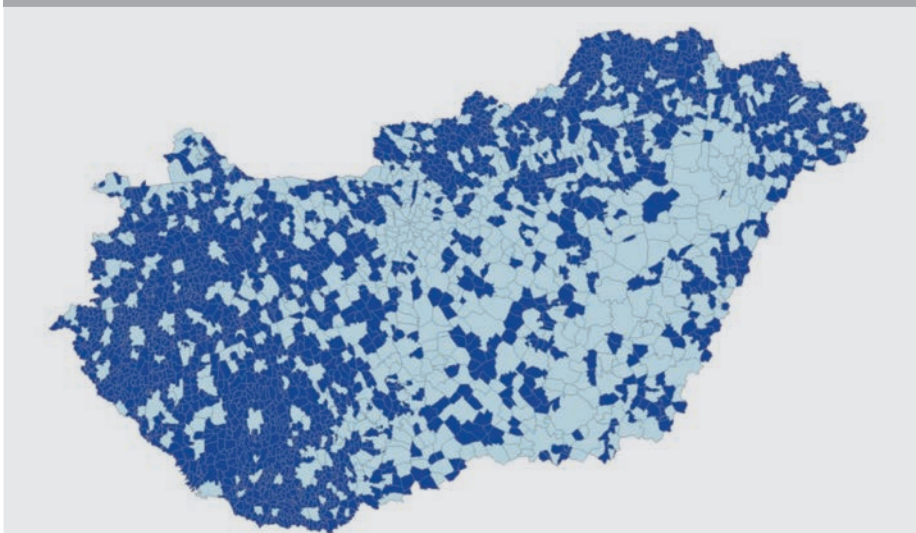
Also based on this survey we know that general institutional trust in the banking system is the lowest among the elderly, among those with primary education and in the Northern Great Plain region.

With regard to access to the banking system, it is worth noting that currently there are few ATMs in operation that allow both cash withdrawals and cash deposits. Thus, if a person, who does not receive their income on a bank account, wishes to be a customer of a bank in connection with savings or loan repayments, then administration and regular payment for them can be done by visiting the nearest bank branch.⁸ Therefore, access to the financial institutional system is indicated in the context of whether at least one bank or savings cooperative has a branch in a given settlement.

⁸ Alternatively, a Posta bank account opened at the Hungarian Post Office (Magyar Posta) could also be used, but this can be managed in person only at 230 post offices. Although according to the HCSO (2018), 76 per cent of the population frequently uses the Internet and 54 per cent of them are used to banking online, currently at least the first borrowing requires personal presence. Fully online solutions are mostly available for existing customers.

Based on this, significant spatial inequalities emerge. Overall, 78 per cent of Hungarian settlements do not have a branch, but while in Central Hungary and at the Southern Great Plain access is provided almost everywhere, in Northern Hungary and Veszprém, Somogy, Zala and Vas counties access is only possible in the largest cities. This also means that, especially in the Western and Southern Transdanubia region, but also in Nógrád and Borsod-Abaúj-Zemplén counties, it can be a significant problem that, while rural transport infrastructure is not flexible enough to reach larger settlements, no financial infrastructure is built locally (*Figure 4*). Instead of setting up bank branches, which significantly increase the operating costs of banks, in these areas the improvement of access to finance could be promoted not only by the spread of digital, cashless solutions, but also by the whitening of the economy, which, however, goes beyond the scope of the present study.

Figure 4
Location of settlements with bank branches



Note: Settlements shown in dark blue are those where no bank or saving cooperative has a branch (based on December 2019 data).

Source: MNB

In the following, we present the results of our order-of-magnitude and spatial estimation regarding the Hungarian population potentially affected by usury lending. It is important to emphasise that the order-of-magnitude estimation refers to the proportion of households potentially affected by usury due to vulnerability, at least on an ad-hoc basis, while the spatial estimation is focused on settlements where usury lending is likely to be more widespread based on the aggregate data

of settlements and districts. In the absence of direct data sources, our study only covers indirect estimations, and therefore, our possibilities for validation are limited.

3. Magnitude of the population potentially affected by usury – based on micro-level data

Since no specific data are available for financially vulnerable groups potentially exposed to informal financial intermediation, to identify the target group we used the European Union Survey on Income and Living Conditions (SILC), which was conducted with the participation of 8,142 Hungarian households.⁹ The survey contains questions relevant to our study, as they include, among other things the size and structure of income and expenditure,¹⁰ relative financial status, living conditions (housing conditions), financial conditions (existence of loans), as well as banking relation (existence of bank account).

First, we identified those households for which the declared expenditures exceed the declared incomes (*negative income gap*), as in their case, there is a high likelihood of demand for – primarily liquidity – loans. In the case of 34 per cent of the households in the sample, a monthly deficit can be observed in this sense. At the same time, given that households are likely to overstate their expenditures but understate their incomes, we also found it necessary to examine additional vulnerability indicators.

On the basis of intuition and literature experience, the following factors were selected from the indicators included in the survey to determine vulnerability:

- (1) The household cannot afford an unexpected expense amounting to HUF 70,000 and pay it using its own resources.
- (2) None of the household members has a bank account.
- (3) In the preceding twelve months of the data collection, the household has been in arrears – i.e. has been unable to pay rent / utility bills / mortgage payments on time – due to financial difficulties, two or more times.
- (4) – (5) The subjective income situation of the household is unfavourable (two indicators): 1) The household is able to make ends meet, namely, to pay for its usual necessary expenses with great difficulty or with difficulty, and 2) it places its own income situation in the lower three deciles.

⁹ Data for 2016 recorded in 2017.

¹⁰ Time management for the income and expenditure side was different: income was household income for 2016, whereas expenditures were for “an average month”, in the assessment of which the months closer to the survey could have been given more weight.

(6) The household lives in unfavourable housing conditions: there is no indoor flush toilet in the dwelling, or it is shared; or there is no shower unit or a bathtub in the dwelling, or it is shared; or they are unable to keep their home adequately warm; or there is no running water in the dwelling.

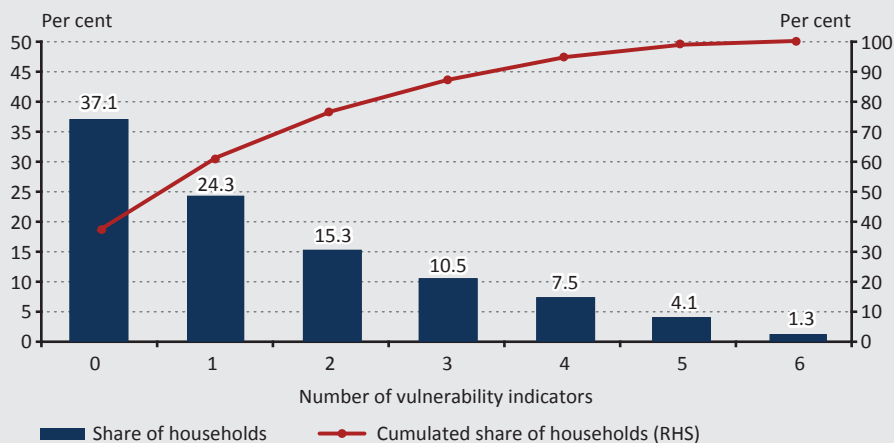
Based on the individual indicators, a mixed picture emerges: 9 to 42 per cent of the sample can be considered vulnerable (*Table 1*). According to the lack of bank account, which is a particularly important factor for our analysis, a large proportion (28 per cent) of the respondents are unbanked. Lack of payments due to financial difficulties occur in the smallest proportion, because presumably, one of the top priorities is that the household does not have housing-related debt. Difficulty in making ends meet, however, shows an unexpectedly high rate of 42 per cent frequency in the sample, but this may also be accompanied by a tendency to an overly negative perception.

Table 1	
Proportion of vulnerable households in the sample according to the individual indicators	
Vulnerability indicators	Proportion of vulnerable households in the total sample (%)
Household has been in arrears – i.e. has been unable to pay rent / utility bills / mortgage payments on time – due to financial difficulties, two or more times	8.9
Household lives in unfavourable housing conditions	12.9
Household places its own income situation in the lower three deciles	18.4
None of the household members has a bank account	28.3
Household cannot afford an unexpected expense amounting to 70,000 HUF and pay it through its own resources	33.9
Household is able to make ends meet, namely, to pay for its usual necessary expenses with great difficulty or with difficulty	41.9

Source: Calculations are based on EU-SILC data

In our view, however, the disadvantageous situation shown by an indicator *in itself* does not necessarily mean that the household is vulnerable. We believe that the likelihood of vulnerability increases in parallel with the increase of the number of vulnerability characteristics. Consequently, we looked at how the households in the sample are distributed according to the number of vulnerability indicators that characterise them (*Figure 5*). At least one of the vulnerability indicators appears in 63 per cent of the households, and then with the increase of the number of indicators the share decreases.

Figure 5
Distribution of households by number of vulnerability indicators



Note: $N = 8,139$.

Source: Calculations are based on EU-SILC data

The next step was to determine which households should be considered vulnerable according to the *number* of vulnerability indicators, i.e. how many vulnerability indicators must *co-exist* in order for a given household to be considered vulnerable. To determine this, we went back again to the academic literature: we examined the expenditure structure of vulnerable households, for which the survey provided an adequate basis, as it contained data by main expenditure category. For households grouped by the number of vulnerability indicators, *Table 2* presents the median of the ratio of the given expenditure category within total expenditures.

Table 2
Typical share of household expenditures (per cent) by the number of vulnerability indicators

Number of vulnerability indicators	Food	Alcohol, cigarettes	Clothing	Housing costs	Health	Transportation	Communications	Culture	Education	Catering services
0	23.2	2.6	3.4	23.6	3.9	12.4	7.3	5.0	1.8	4.8
1	27.2	3.3	2.6	27.0	5.4	11.2	7.0	3.9	1.5	4.9
2	28.5	3.5	2.1	29.6	5.6	9.4	6.3	3.4	1.4	5.4
3	28.6	4.6	2.0	30.2	5.9	8.4	6.1	3.5	1.4	5.7
4	31.0	4.4	1.8	31.0	5.3	5.2	5.8	3.6	1.2	4.8
5	33.5	6.5	1.7	31.7	5.6	4.5	4.8	3.4	0.7	4.7
6	31.8	7.2	1.2	36.3	4.3	4.9	4.3	4.2	0.9	6.2

Note: For households grouped by the number of vulnerability indicators, we present the medians of the ratio of the given expenditure category within the total expenditure.

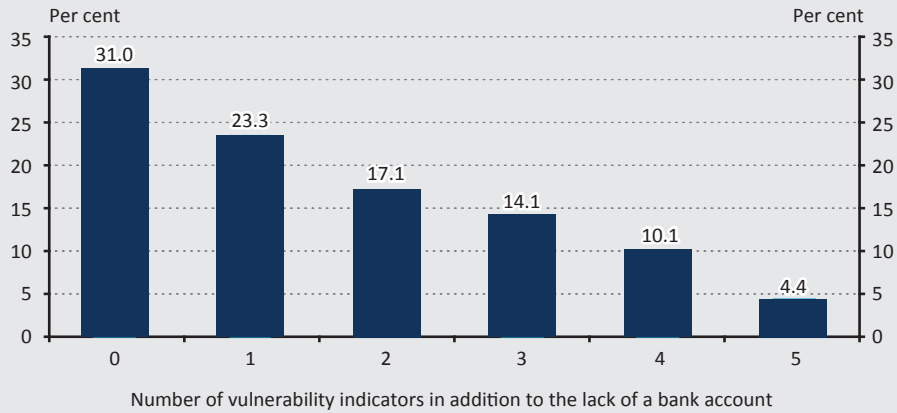
Source: Calculations are based on EU-SILC data

On the one hand, the results confirm what is set out in the academic literature. It is apparent that the more vulnerable a household is, the larger the share of expenditures it spends on food, alcohol, tobacco and housing, with a subsequent reduction in the share of clothing and especially transportation expenditures. On the other hand, they also provide an indication, according to the number of vulnerability indicators, as to between which groups we should draw the line regarding households considered vulnerable. In the case of food and transportation expenditure category indicators, which we consider crucial, it can be seen that, disregarding the differences between households without a vulnerability indicator and those with one vulnerability indicator, the largest change in expenditure shares appears among the households characterised by three and four vulnerability indicators. Consequently, under these criteria, households that can be considered to be in a disadvantageous position according to at least *any* four of our six vulnerability indicators were considered vulnerable. These households make up 13 per cent of the total sample. As a conservative estimate, we also examined households that additionally have a *negative income gap*, as we assume that they are likely to be even more disadvantaged financially. Defined in this way, 4.3 per cent of the households are vulnerable.

Given that our analysis focuses on which households are outside the realm of banking system, we also examined how the number of vulnerability indicators is distributed among the households *without a bank account* (that is 28 per cent of the *total* sample) (*Figure 6*). In this case as well, those households with at least four vulnerability indicators were considered vulnerable (one of these indicators, by definition, is the lack of bank account). We found that around 29 per cent of those without a bank account, i.e. 8 per cent of the *total* sample, are in the group of those who are potentially exposed to usury lending, at least on an ad-hoc basis. Taking the common intersection with the *negative income gap* as the lower limit, we arrived at a figure of 3 per cent of the households. It should be emphasised, however, that even though a household is vulnerable, we have no information on its specific financial coping strategy (family, friends, employer loan, usury).

Thus, using the European Union Survey on Income and Living Conditions with respect to the order-of-magnitude of the Hungarian population potentially affected by usury lending, we concluded that 3–13 per cent of the Hungarian population is exposed to this risk, which, due to the high costs, can easily lead to spiralling debt problems, based on the academic literature. In the following, we present a spatial estimate of potential impact, based on a different data source.

Figure 6
Distribution of households without a bank account according to vulnerability indicators



Note: N = 2,305. In the figure, zero represents the proportion of households without a bank account for which no other vulnerability indicator exists. In the figure, 1 represents the proportion of households without a bank account for which, in addition, there is precisely one vulnerability indicator.

Source: Calculations are based on EU-SILC data

4. Areas potentially affected by usury – based on aggregate data

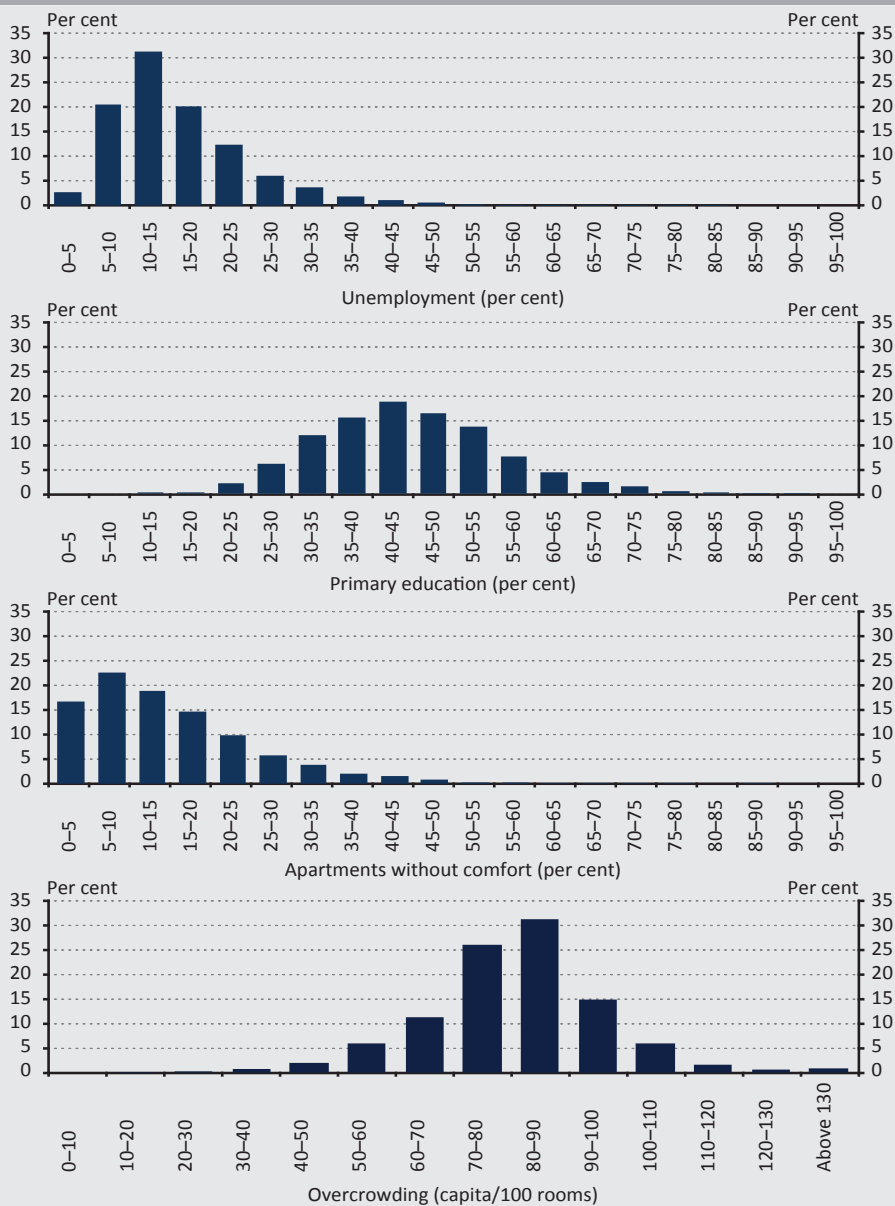
In Hungary, the standard of living of the population is geographically heterogeneous. For this reason, in order to map informal lending, it is necessary to identify areas where there are limited opportunities to contact financial institutions. Our research examines the existence of banking relation, focusing on the most underdeveloped areas of the country, as the lack of banking relation may be one of the elements of the emergence and widespread use of usury lending in a given area.

For measuring economic underdevelopment, we considered four factors:

- Unemployment rate (%): the number of unemployed in relation to the number of unemployed and employed persons.
- Proportion of those with primary education (%): the number of people with no more than primary education in relation to the adult population.
- Proportion of apartments without comfort (%): proportion of apartments that have at least one living room and kitchen, but do not have a bathroom and indoor flush toilet; water and electricity are not provided and heating is only possible on an individual way.
- Overcrowding (persons / 100 rooms): Number of residents per 100 rooms to measure crowded housing conditions.

These indicators were prepared on the basis of settlement-level data from the 2011 census (Figure 7), and therefore they can be considered somewhat outdated. At the same time, due to their completeness and data quality, they can be suitable sources for measuring economic underdevelopment, all the more so because in less than a decade probably only a few settlements have significantly changed their relative status.

Figure 7
Distribution of underdevelopment indicators by settlement

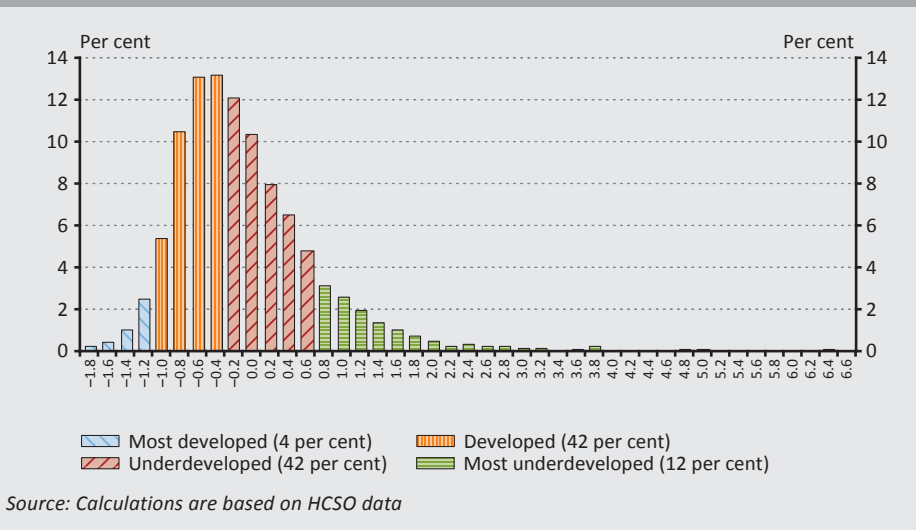


Note: The horizontal axis shows the value bands of the variable in question.

Source: HCSO

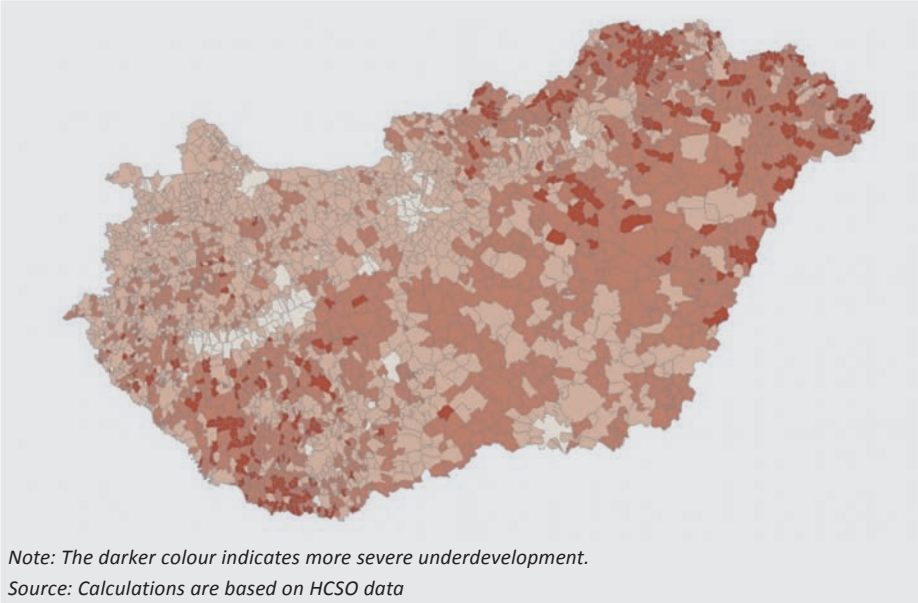
After standardisation (which was performed to eliminate the order-of-magnitude and dispersion deviations), the above four indicators were averaged, thus obtaining the value of economic-housing underdevelopment per settlement (*Figure 8*). The indicator thus obtained is a number without a unit of measurement, which is intended to indicate the relative state of development of the settlements. From the constructed economic-housing underdevelopment index, we formed four categories for which we used as a basis the larger changes seen in the frequency distribution of the indicator. In fact, we delimited the most developed and least developed settlements on the assumption that these groups can also be well distinguished from other settlements in terms of its cardinality. Thus, we identified the most underdeveloped 12 per cent of Hungarian settlements, where on average economic and housing conditions are the worst.

Figure 8
Distribution of Hungarian settlements in terms of economic-housing underdevelopment



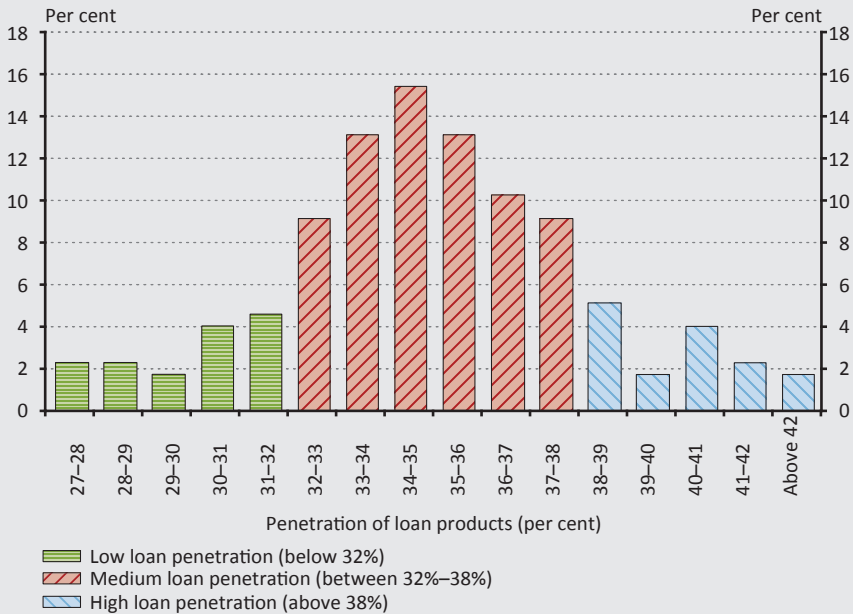
Based on the spatial location of the settlements, we can see that the most disadvantaged settlements in terms of economic-housing underdevelopment are located in Northern Hungary, Hajdú-Bihar and Jász-Nagykun-Szolnok counties, as well as in the Southern Transdanubia region, whereas the majority of settlements in the Western Transdanubia region and in Central Hungary have the most favourable relative status (*Figure 9*). Based on the economic-housing underdevelopment index, 7 of the 10 poorest settlements are located in Borsod-Abaúj-Zemplén county, and especially the tiny settlements of Cserehát are affected by the problem of deprivation caused by low education, employment and income.

Figure 9
Relative extent of economic-housing underdevelopment in Hungarian settlements



In addition to the poor economic conditions, the exposure to usury lending is also due to the fact that the area is not sufficiently channelled into the realm of the banking system, and therefore, “formal” loan penetration is low. In order to take this into account in the analysis, we used data from the CCIS to determine the proportion of persons with loans at the end of 2018 relative to the total adult population at the district level (these data are not available at the settlement level). Loan penetration was considered low in districts where less than 32 per cent of the population had a loan (*Figure 10*).

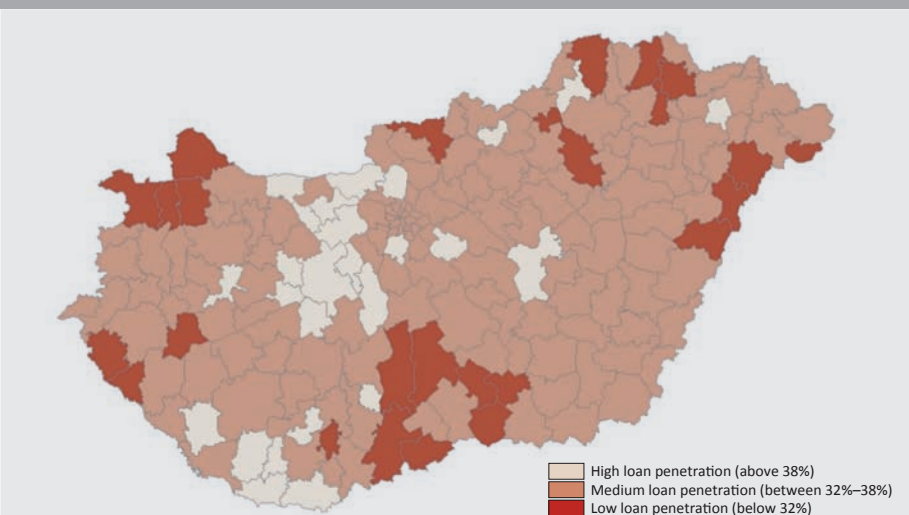
Figure 10
Distribution of Hungarian districts by loan penetration



Source: Based on MNB (CCIS) data

Loan penetration is not directly related to economic underdevelopment: in Baranya, one of the most underdeveloped counties, there are districts that belong to the group with the highest loan penetration. In a county comparison, low loan penetration occurs in both the most underdeveloped (Borsod-Abaúj-Zemplén) and the most developed (Győr-Moson-Sopron) districts (*Figure 11*). Low loan penetration characterising both developed and underdeveloped districts can be explained by the fact that, while wealthy households can achieve their investment and consumption purposes without loans (and those with euro income near the western border can now also do so with the help of Austrian banks), those living in deprivation do not have access to bank loan products in the absence of banking relation and declared job (for low loan penetration districts, see *Annex 2*).

Figure 11
Loan penetration in Hungarian districts



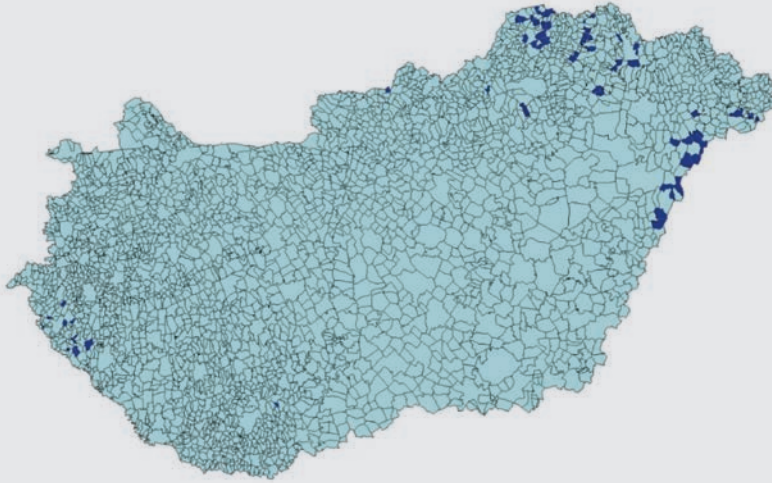
Note: Loan penetration is the number of active loans contracts at the end of 2018 relative to the total population.

Source: Based on MNB (CCIS) data

Based on all of this, economic-housing underdevelopment and loan penetration should be taken into account jointly, as they together identify the areas potentially affected by usury (*Figure 12*). These areas are therefore those where the economic-housing underdevelopment index is above 0.8 and, at the same time, the loan penetration indicator is less than 32 per cent. The majority of the 64 settlements thus produced are located in Borsod-Abaúj-Zemplén county. After that, Szabolcs-Szatmár-Bereg, Zala and Hajdú-Bihar counties are represented on a smaller scale, along with Baranya, Nógrád and Heves counties with 1 settlement each. Only one of the 64 settlements has a bank branch, which – for the reasons mentioned in *Section 2* – may also be a necessary condition for lack of connection with the formal financial intermediary system. These settlements, which are presumably more interwoven with the local community, and thus on the whole are more exposed to usury, are home to about 40,000 people, representing 0.43 per cent of the total population.¹¹

¹¹ This does not mean that there is no usury lending in the more developed settlements, as it also occurs in large cities, even in Budapest, but these settlements, due to their aggregate development indicators, are not included in the results of such a macro approach estimate.

Figure 12
Estimation results settlements exposed to usury lending



Note: The darker shade indicates settlements potentially exposed to usury.

Source: Calculations are based on MNB and HCSO data

Our possibilities for direct backtesting to validate our spatial results are limited, but based on crime statistics, we can get some indication in this regard.

The crime of usury as a criminal offence entered into force on 1 March 2009.¹² According to the available data, the number of – reported – crimes of usury was rather limited until 2011, however, this may not only be due to the actual low incidence of violations (*Figure 13*). This is also suggested by the fact that between 2011 and 2012, the number of registered crimes of usury increased significantly, more than tripled, which may have been partly due to the tightening of usury regulations in 2011: indeed, *Act CXXXIV of 2011 amending various laws related to usury* enhanced the punishment for criminal usury and also expanded the scope of punishable offences.

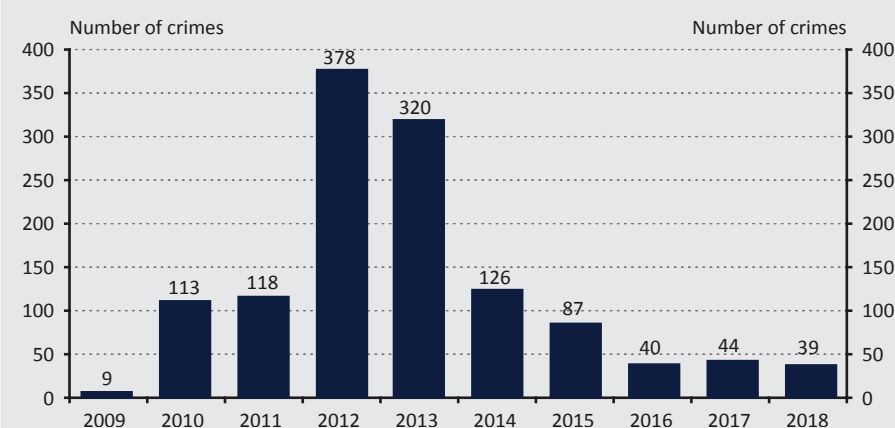
Until the amendment of the law, the crime of usury was deemed to exist if someone took advantage of the victim’s needy situation, by contracting a deal in a business pattern that contained particularly disproportionate consideration, the fulfilment of which exposed the victim or his / her relative to serious or further deprivation. *Business pattern* in this wording meant that the perpetrator is engaged in criminal

¹² See *Act IV of 1978 on the Criminal Code, Section 330/A, modified by Act CXV of 2008*. In addition to the Criminal Code, civil law also regulates usury: since its entry into force in May 1960, the Civil Code has stated that a usury contract shall be deemed to exist if, at the time of concluding the contract, the contracting party stipulates a conspicuously disproportionate advantage, knowing and exploiting the situation of the other party.

activities of the same or similar character to generate profits on a regular basis. Due to that clause, however, a person who entered into an agreement containing particularly disproportionate consideration on a single occasion was not punishable. Following amendment of the law, the perpetrator became punishable even if he / she committed the above offence *only once*. Another enhancement is that while previously the offence committed in a business pattern was punishable by imprisonment for up to three years under the law, following the amendment *even a five-year* prison term can be prescribed. It also facilitates the detection of crimes that the court can *mitigate* the punishment *in an unlimited way* if the perpetrator reports the crime of usury to the authority before it becomes known to the authority.

From 2013, the number of registered crimes of usury started to decline again, as in that year the Commissioner for Fundamental Rights called on the government to set up a complex crisis management service (*Office of the Commissioner for Fundamental Rights, 2013*).¹³ At the same time, the improvement is partly statistical and can be traced back to the emergence of newer, less clear forms of usury (e.g. food usury, see *Béres, 2015*).

Figure 13
Number of crimes of usury registered



Source: Prosecution Service (2018), Ministry of Interior Criminal Statistics System

¹³ "Under current practice, victim assistance includes enforcement of the victim's interests, providing instant financial aid as well as legal aid. However, it is a general experience that, due to strict legal rules, victims of usury cannot receive either instant financial aid or compensation. The service can typically assist them with information. In order to increase the effectiveness of victim assistance, the Commissioner, therefore, proposed that the Minister of Public Administration and Justice in cooperation with the Minister of the Interior and the Minister for Human Resources initiate the establishment of a *crisis management service to assist victims of criminal usury in a complex way (...)*" (*Office of the Commissioner for Fundamental Rights 2013: p. 63*).

In order to validate our results, we compared the regional distribution of registered crimes of usury with the spatial distribution of potential involvement revealed on the basis of our own research (Table 3). The distribution of reported crimes shows a similar picture to what we found. Based on the officially registered data, similarly to our results, Borsod-Abaúj-Zemplén and Szabolcs-Szatmár-Bereg counties have the highest involvement: 28 per cent of the crimes of usury registered between 2013 and 2018 took place in the former county and 19 per cent in the latter one, while 53 per cent of the 64 settlements we identified are in Borsod county and 17 per cent are in Szabolcs county. In our research, however, we also identified 10 settlements in Zala as exposed to usury, but the official crime statistics do not show the county involvement. By contrast, according to crime statistics, Jász-Nagykun-Szolnok is the third most affected county, while according to our research, none of the potentially affected settlements with the lowest loan penetration and the most significant economic-housing underdevelopment are located in this county. In the fourth place is Hajdú-Bihar county, which is also in line with our settlement-level results, and therefore, the absence of Jász-Nagykun-Szolnok county is likely to be due to the obsolescence of settlement-level underdevelopment data.

County	Total number of crimes of usury registered between 2013 and 2018	Distribution of crimes of usury registered between 2013 and 2018 (%)
Borsod-Abaúj-Zemplén	183	27.9
Szabolcs-Szatmár-Bereg	122	18.6
Jász-Nagykun-Szolnok	66	10.1
Hajdú-Bihar	64	9.8
Nógrád	50	7.6
Pest	37	5.6
Bács-Kiskun	26	4.0
Budapest	22	3.4
Heves	21	3.2
Békés	19	2.9
Somogy	18	2.7
Komárom-Esztergom	8	1.2
Csongrád	6	0.9
Baranya	5	0.8
Veszprém	4	0.6
Fejér	3	0.5
Vas	2	0.3
Győr-Moson-Sopron	0	0.0
Tolna	0	0.0
Zala	0	0.0

Source: Prosecution Service (2018), Ministry of Interior Criminal Statistics System

5. Conclusions

Overall, based on our results, we estimate the proportion of vulnerable households at between 3 and 13 per cent by setting an estimation band. In other words, according to our estimate, in Hungary, out of 4 million households – as reported in 2016 – the number of households that, due to their vulnerability, may be exposed to informal financial intermediation and may create potential demand for such financial services is between 113,000 and 523,000. However, in the absence of direct data, the extent of usury lending is difficult to measure, and therefore in our analysis we mapped the possible order-of-magnitude of the problem.

Based on the data at the settlement and district level, we also made an estimate of which settlements usury lending may be widespread in. Our results show that settlements in Borsod-Abaúj-Zemplén, Szabolcs-Szatmár-Bereg and Hajdú-Bihar counties close to the country border may be affected. The involvement of these areas is in line with the county-by-county breakdown list of crime statistics.

More detailed research on usury lending is hampered by a number of factors. Due to its hidden nature, administrative data collection is not carried out by definition, and the debts are registered informally by the lenders. Due to the spatial concentration indicated by the academic literature, the illegality of lending activity and the intimidation used as a workout strategy, even the quantitative questionnaire surveys cannot give a real picture of the role of usury lending in Hungary. The studies in the academic literature use qualitative methodological tools: interviews, focus groups, and participatory action research are used to map the ways of money management and acquiring funding in a given settlement.

Over the longer term, the credit demand of the household exposed to informal lending cannot be met by the bank credit market; this is not possible due to the prudential regulation and the business model. Before taking measures to eliminate usury lending, the regulator needs to map the circumstances and motivations of those involved through on-site research, as a stronger reduction of usury by legal means alone will not provide a solution regarding the funding needs of those who resort to it. Given that this range of the population can be considered vulnerable in several respects, policy steps to eradicate the problem should include targeted territorial and housing subsidies as well as promoting access to financial services, in particular through digital channels, and financial education.

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Annexes

Annex 1: Development of debt cap rules in Hungary

In order to mitigate the risks arising from household excessive indebtedness, the Magyar Nemzeti Bank's *Decree No. 32/2014. IX. 10.* (debt cap rules) that entered into force on 1 January 2015, limited the maximum size of the debt service-to-income ratio (DSTI) and the loan-to-value ratio (LTV) in household lending by financial intermediaries.

The debt cap rules are to be applied when determining the instalments of debt arising from non-business credit, loan and lease contracts required for individuals. The DSTI limits the maximum debt service burdens that may be undertaken when taking out a new loan in the given proportion to the customers' regular income, thereby reducing customer indebtedness. When calculating, the amount of the monthly instalment shall be divided by the amount of the proven monthly net income. In the case of co-debtors, the proven monthly net incomes can be added together. The loan-to-value ratio (LTV) limits the maximum amount of credit that may be taken up relative to collateral (real estate value) in the case of secured loans (such as mortgage loans).

Levels of domestic DSTI and LTV limits

		HUF	EUR	Other currency
DSTI	Monthly net income below HUF 400,000	50%	25%	10%
	Monthly net income at least HUF 400,000	60%	30%	15%
LTV	For mortgage loan	80%	50%	35%
	For auto loan	75%	45%	30%

Note: Applicable from 1 January 2015 to 1 October 2018.
Source: MNB

From 1 October 2018, the MNB, in order to encourage the expansion of mortgage lending with longer interest rate fixation periods, amended the debt cap rules by the *MNB Decree No. 29/2018. VIII. 21.* Under the new regulation, debt service-to-income ratios differentiated by interest rate fixation period have been determined.

Debt service-to-income ratio by interest rate fixation period

Monthly net income	Interest rate fixation period		
	Less than 5 years	At least 5 years but less than 10 years	At least 10 years or fixed for the whole term
Below HUF 400,000 (HUF 500,000 from 1 July 2019)	25%	35%	50%
At least HUF 400,000 (HUF 500,000 from 1 July 2019)	30%	40%	60%

Note: Applicable since 1 October 2018.
Source: MNB

Borrowers with a higher level of income will still be allowed to borrow with higher monthly instalments due to their higher debt repayment capacity. From 1 July 2019, considering also to the increase in wages, the Decree allows to undertake higher instalments at or above HUF 500,000 of monthly net income (*MNB Decree No. 24/2019. VI. 26.*).

Annex 2: Districts with low penetration of loan products by county

Bács-Kiskun Bácsalmás Baja Kalocsa Kiskőrös Kiskunmajsa	Győr-Moson-Sopron Csorna Kapunár Mosonmagyaróvár Sopron
Baranya Pécsvárad	Hajdú-Bihar Derecske Nyíradony
Borsod-Abaúj-Zemplén Edelény Gönc Mezőkövesd Sárospatak Tokaj	Heves Bélapátfalva
Csongrád Kistelek Mórahalom	Nógrád Balassagyarmat
	Szabolcs-Szatmár-Bereg Csenger Nyírbátor
	Zala Keszthely Lenti Letenye

Source: MNB

The Holy Trinity of Growth*

András Balatoni

Michael Best:

How Growth Really Happens: The Making of Economic Miracles through Production, Governance and Skills

Princeton University Press, 2018, p. 320

ISBN: 978-0691179254

Hungarian translation:

Hogyan történik valójában a növekedés? Gazdasági csodák teremtése termelés, irányítás és készségek által

Pallas Athéné Könyvkiadó Kft., Budapest, 2019, p. 360

ISBN: 978-615-5884-35-1

The birth of macroeconomics is mainly related to the study of cyclical movements in the economy. Keynes was inspired by the societal cost of the recurrently appearing, rather persistent unemployment to develop his general theory that diverged from the Neoclassicals. At that time, theory and economic policy (Roosevelt's New Deal) were evolving in parallel, but a sophisticated measurement of real economic performance, i.e. the establishment and general spread of national accounts, was at least a decade away.

After a few years of data collection, statisticians and economists also began to analyse the emerging trends. This was the period when the long-term, so-called *stylised facts* of economic growth were first documented (*Kaldor 1957*). One of the most important phenomena awaiting explanation was that GDP per capita was steadily increasing in the USA and in some developed industrialised countries. Overall, economists struggled to map this phenomenon for quite some time, with rather limited success. In fact, empirical studies showed that the bulk of the growth was due to the residual principle, which was not addressed in the models. This is what the entire literature on growth accounting was all about. For good reason, *Moses Abramovitz (1956)* called the "Solow residual" a "measure of our ignorance", pointing out that there are indeed more unanswered questions about economic growth than there are satisfying answers. The situation is just made

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

András Balatoni is a Director at the Magyar Nemzeti Bank. Email: balatonia@mnbb.hu

more complicated by the experience of middle income economies over the past half century. In most countries, the catch-up process gets stuck after a while. This is called the Middle Income Trap (MNB 2018). However, there are countries that have broken out of this trap as a growth “miracle” and have joined the elite club of developed economies.

Miracles and ignorance. That does not sound very scientific! Why is it so hard to capture the phenomenon of growth? What is so special about the process? What are the key factors that will make a country and economy successful or moderately developed? Some researchers consider the human capital (Lucas 1988), some the increasing return observed in the R&D sector (Romer 1990), others the institutional conditions (Acemoglu and Robinson 2012) and still others the spatial structure (Varga 2009) to be a critical factor. Who is right? Probably everyone is partly right. At the same time, economics has still not been able to ensure that after much hard work, a standard,¹ comprehensive theory and model is elaborated which, by including the important factors, could explain *how growth really happens*.

Michael Best takes on this task in his book. Best, by the way, can be considered a black-belt veteran on the subject of industrial growth: he is a Professor Emeritus at the University of Massachusetts Lowell and Co-Director of the Center for Industrial Competitiveness. He has examined businesses in more than 20 countries and personally gotten to know hundreds of companies thoroughly over the past nearly 20 years. He is the author of a number of books and scientific articles, a real hotshot on the subject.

But let’s get back to the book. The methodology of research is based primarily on case studies. Unfortunately, in standard macroeconomic growth theory methodology, we do not often encounter the methodology of case studies, even though it is a complex system incorporating the functioning of the economy, which can be well demonstrated through historic examples. The reader gains a very interesting insight into the American wartime economy and the industrial ecosystem around Boston. But the book goes beyond an analysis of the narrowly understood industrial economy of the USA. It also presents the secret of Germany’s successes, the background to the Japanese production miracle and the rise of China. At the same time, it cites bad examples: it reveals the decline in industrial production in the United Kingdom, the dual economy of Ireland and the growth slowdown in the USA in recent years. All this is made even more exciting by instructive sectoral stories.

The book’s main conclusion is that the key to success lies in the so-called Capability Triad. This Capability Triad consists of business model, production system and skill

¹ Like the standard theory emerging in physics.

formation. Accordingly, there is no point in us having a great business model if we do not have the production technology to produce the given product in the right volume and quality. Continuous development of the skills of business professionals, managers and employees is at least as important. Best found that successful development policies are the ones that are aware of the interrelated, mutual impacts of this Capability Triad and that build the strategy on their development.

Best's book focuses on the supply side of the economy. On the one hand, this supply side is often painfully simplistic in the standard macroeconomic models and, on the other hand, it is a critical factor in terms of whether macroeconomic demand can support growth or increases inflation or possibly impairs the external balance.

In the fourth chapter of the book, the author deals with the theoretical historic sprouts of the Capability Triad. This can be considered the theoretical basis of the Capability Triad derived from the case studies. Although the list of quoted classical economists is impressive and multifaceted, the theoretical conclusions are not very convincing. The key, according to the author, is the increasing return, the existence of which is so easy to disprove (*Jones 1995*), even in activities such as research development. The so-called Moore's law is an excellent example of disproving the increasing return (*Bloom et al. 2017*). The law states that the complexity of computing processors doubles roughly every two years. In order to sustain this growth, however, today 18 times as many researchers have to work on the task as did in the 1970s. Therefore, we need to invest more and more resources to uphold Moore's law. What is this if not a diminishing return?

Another thought on my mind while reading the book was that the demand side was completely omitted. In recent years, researches on hysteresis have definitely shown that negative demand effects (crises) cause permanent damages, on the supply side of the economy as well (*MNB 2016*). By contrast, a managed, high-pressure economy can permanently increase its performance. Long-term, sustainable economic growth requires demand, adequate fiscal, monetary policy, deepening credit markets as well as expanding productive capacities.

My third critical observation concerns the strict industrial focus that permeates the entire book. In modern economies, the weight of the service sector is dominant today and this large-scale sectoral rearrangement is expected to continue in its favour in the future (*MNB 2017*). Does the Capability Triad also play a key role in the growth of this sector? Maybe so, but certainly not in the same way as it occurred in the case of the 20th century industrial success stories cited as examples.

Socially, ecologically and financially sustainable economic growth is in the common interest of all of us. So no one can be indifferent to the subject. I particularly recommend the book to those students familiarising themselves with growth

theories, who – in addition to dry equation systems – want to understand the success stories of economic growth in their own complexity. The devil is indeed in the details, and fortunately the reader gets to know a great many details when reading the book. At the same time, industry and development policy professionals and business leaders alike will find a useful framework for thinking.

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Back to the Basics – What Are the Flaws in the Financial System?*

Eszter Baranyai

Vedat Akgiray:

Good Finance: Why We Need a New Concept of Finance

Bristol University Press, 2019, p. 160

ISBN: 978-1529200003

Hungarian translation:

Helyes pénzügy – Avagy miért szükséges a pénzügyi rendszer újragondolása

Pallas Athéné Könyvkiadó, Budapest, 2020, p. 155

ISBN: 978-615-5884-65-8

The primary task of the financial system should be to serve the real economy. Opinions vary as to how well it does in this regard. According to Mariana *Mazzucato* (2017), a renowned contemporary economist, it extracts value rather than creates it, and Vedat Akgiray's book is based on a similar premise.

Why does finance appear detached from the real economy, seemingly becoming an end unto itself? What are the flaws of the financial system and what remedies are there? One inevitable legacy of the crisis is reflection. In an environment where the global economy struggled to recover from the 2008 meltdown and now once again finds itself in crisis, where there are fresh memories of prominent players of the global financial system being bailed out using taxpayer's money, where the top executives of international banks often earn over a hundred times more than the average employee as income inequalities widen, the popularity of the topic should come as no surprise. Yet Akgiray's book is not merely one of the many touching on the topic. It is noteworthy for several reasons.

The author poses fundamental questions, without assuming extensive prior knowledge of the readers about the financial system. Supporting material is provided throughout, with carefully chosen, telling statistics. The book was written by someone who is not only an academic and a former university teacher, but also a hands-on expert: he headed Turkey's Capital Markets Board and became a go-to

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

*Eszter Baranyai is a Master Lecturer at the Corvinus University of Budapest.
Email: eszter.baranyai@uni-corvinus.hu*

figure at an international organisation during the 2008 crisis. The book, therefore, offers a nice blend of theory and practical experience. Last but not least, although the author is intimately familiar with the financial processes of the developed world – not least because of his work at the IOSCO (International Organisation of Securities Commissions) – he is strongly linked to a developing country, Turkey. Perhaps the perspective of a less mature financial system lent him some courage to question the value added of the large and complex world of finance in order to complement the multitude of internationally-acclaimed books – most of which were written by authors from advanced economies.

The book starts with the aim of finance, underlining that it connects various stakeholders in time and space, enabling flows of money and risk. This is followed by a brief historical overview documenting that the countries with more efficient financial systems have developed more rapidly. In high-income countries, financial markets are much larger relative to GDP than in middle- or low-income countries. Financial markets in high-income countries have experienced a spectacular expansion since the 1980s, related to deregulation measures, the rise of global free trade, technological progress and the credit boom driven by both the consumer society and the growth needs of developing countries. While earlier crises were typically isolated in space, the operation of the global financial system has led to widespread contagion. Although the author does not blame the financial system alone for the 2008 global economic crisis, he notes – consistent with several studies – that financial crises compound real economy crises.

After the historical introduction, Akgiray takes stock of what he views as the most crucial problems with the financial system. First, he believes that the financial sector is too large. Since the 1980s its growth has far exceeded that of the volume of trade or the global economy. Also, the trading of derivatives – a type of financial instrument – takes place overwhelmingly among financial institutions, which Akgiray – somewhat questionably – cites as evidence towards finance serving itself. Do we see economies of scale in the (now) larger financial sector? The author's answer is a definite no, stressing that the sector's productivity has diminished as it increased in size. One only needs to think of an equity fund that determines its asset management fee as a share of the assets managed: in a bull market, the asset management fee rises, although it is unclear why asset management or advisory services would cost more in such a situation. Technological innovations and the synergies arising from globalisation should have reduced the unit cost of intermediation.

An oversized financial system is also detrimental to the real economy because it can lead to excessive lending, partly to less profitable and risky projects and borrowers. Moreover, the high salaries paid in the sector could divert the best workers from other, more productive sectors. To cite James Tobin, one of the most influential

economists of his time, *'we are throwing more and more of our resources, including the cream of our youth, into financial activities remote from the production of goods and services'* (Tobin 1984:14).

Closely linked to the oversized financial system is the high level of credit and debt. The world has become even more indebted since the crisis (including relative to GDP). Although in Europe and the United Kingdom the volume of bank lending decreased, this was more than offset by the rise in bank lending in China. And government securities and corporate bond holdings have expanded globally. Few economists dispute the potential of high indebtedness to increase vulnerability with a potential to curb economic growth. Why is it then that regulation is unable to rein in the growth of credit and debt? The author maintains that this is the result of the institution-based regulatory approach. The shift towards market-based lending is partly the result of the fact that, in response to demand, the market creates new credit that is not constrained by existing regulations.

At an aggregate level, the high level of debt is coupled with little equity. There are fewer and fewer initial public offerings (IPOs). What is even more surprising is that in Western countries, the number of publicly listed firms continues to decline. Conversion back into a private company has become popular, often by buying back shares using debt finance. Alongside questions about share prices derived from stock market trading as well as the role of long-term factors, the author notes the oft-cited tax environment as a hindrance. While interest payments on loans reduce corporate tax, dividend payments on stocks do not. In fact, in OECD countries the effective tax rate on capital is, on average, 10 per cent higher than in the case of debt financing.

Akgiray argues that the ecosystem of finance has become unnecessarily complex. With so many profit-maximising players it is no wonder that economies of scale are lacking. While prior to the 1980s the overwhelming majority of publicly-traded shares in the US were held by households, nowadays the majority are owned by institutional investors. Of course, ultimately even today most capital owners are households. Nonetheless, the remuneration structure of fund managers and corporate executives incentivises measures that contribute to short-term stock price increases, which do not necessarily serve the long-term interest of these households. Also, the regulatory authority has responded to the complex system with complex regulation, with increasing compliance costs further reducing productivity.

Akgiray believes that macroeconomists, financial economists and central banks are resistant to change. Financial regulation is still fragmented both geographically and in terms of substance, and central banks have little wiggle room. The most unfortunate legacy of the 2008 crisis is that people have no confidence in the financial system.

The world desperately needs a paradigm shift in finance. With this in mind, the author outlines a number of proposals to address the aforementioned problems. Unsustainable borrowing needs to be limited and corporate tax rules need to be changed, phasing out the incentives for borrowing. Share issues should be promoted by transforming the stock exchange model and revisiting regulatory burdens, with special attention to small firms. Although borrowing induced by the consumer society is difficult to curb, the 'skin in the game' approach should be strengthened at lenders.

Financial regulation should be structured by function rather than on an institutional basis, and this view is becoming increasingly popular as fintechs appear. Accordingly, banking and securities market supervisors should merge, and cross-border cooperation should be enhanced, reflecting the global nature of financial markets. The system has to be simplified. *'It is absurd to spend valuable resources on managing the risks manufactured by self-inflicted complexity'* (p. 129).

Promoting overall financial literacy is a popular goal all over the world. According to the *OECD (2017)*, at least 55 countries have advanced plans or have already started implementing the national strategy of financial education. Nevertheless, Akgiray does not focus on educating the wider society. He believes that it is especially important to lay new foundations for the education of the limited number of future financial experts, because theoretical finance as taught today is far removed from the real world.

In his book, Akgiray does not intend to examine a single issue in meticulous detail by comparing and contrasting arguments on both sides. Instead, he focuses on the big picture to spark a debate using straightforward reasoning and encouraging dialogue. He is a disillusioned author, who believed for decades that finance served 'economic prosperity and social progress'. In Akgiray's words, he wishes to provoke 'wiser people' to think about the flaws of the financial system and how they can be fixed. With its approach questioning the very fundamentals, its clear questions and the statistics presented not only does the book serve this purpose perfectly but it also makes for an easy read. Enjoy!

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Report on the 10th Annual Financial Market Liquidity Conference*

Endre Morvay – Balázs Kotró – Martin Márkus – Zsolt Lakatos

The *10th Financial Market Liquidity Conference* was held on 14–15 November 2019 at the Corvinus University of Budapest (CUB), marking the decennial anniversary of the series. Similar to previous years, the event – which brings together experts from the academic and practical fields of finance – was organised by the Financial Research Centre of the Department of Finance at the university and the Game Theory Research Group of the Centre for Economic and Regional Studies. The conference presenting scientists' latest answers to the questions generated by current market needs was organised with substantial funds provided by the private sector and various foundations. Besides the gold sponsorship of the Foundation of the Department of Finance, major contributions were provided by the CFA Society Hungary, KELER CCP, MSCI, Morgan Stanley, OTP Bank and the Department of Finance of the Budapest University of Technology and Economics. The 150 participants were able to attend 45 specialised presentations and view 11 posters at the two-day conference showcasing 22 countries and 52 institutions.

On 14 November, the first day of the event, *Gyula Vastag*, the Vice-Rector for Research of CUB, welcomed the participants. The keynote of the plenary session following the opening was given by Andrew Karolyi, a Distinguished Professor of SC Johnson College of Business at Cornell University. It was not the first time that Karolyi was a guest and the keynote speaker at the liquidity conference, as he also opened the event in 2017. His presentation lent a solid professional tone to the gathering, even if he did not choose a topic from his own research this time, talking instead, inspired by his editorial work, about the role played, or, if you will, not yet played, by climate finance in science. As executive editor of the *Review of Financial Studies*, Karolyi launched an initiative that led to the publication of a selection of studies analysing the relationship between the world of finance and climate change, a field Karolyi and his colleagues had considered neglected. When the call for papers was made, they were aware that the studies may not necessarily produce significant results, but they hoped to at least provide a publication platform

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

*Endre Morvay is an Education and Research Expert at the Magyar Nemzeti Bank. Email: morvaye@mbn.hu
Balázs Kotró is a PhD Student at the Corvinus University of Budapest. Email: balazsbence.kotro@uni-corvinus.hu
Martin Márkus is a PhD Student at the Corvinus University of Budapest. Email: martin.markus@uni-corvinus.hu
Zsolt Lakatos is a PhD Student at the Corvinus University of Budapest. Email: zsolt.lakatos@uni-corvinus.hu*

for an unjustly overlooked topic. Karolyi and his team practically reversed the traditional publication process: they requested research proposals related to climate finance to be submitted for assessment before giving the green light to the plans and researchers they picked. This ensured that the studies would be published, regardless of the results, in the journal's special issue. The collection of papers was ultimately published in March 2020, with promising articles, for example on the climate change sensitivity and risk management of large corporations, climate change indices and the relationship between house prices and sea level rise.

After the plenary session, the presentations continued in parallel sessions. The different sessions focused on macroeconomics, asset pricing and the bond market as well as theoretical issues and the field of social innovations. The asset pricing session was opened by invited speaker *Niklas Wagner*, a professor at the University of Passau. His presentation examined the role of distinct premia on equity markets in trading and non-trading periods. His research focused on the intertemporal relationship between expected returns and conditional variance and the role of trading breaks. His model merges two different asset pricing processes based on this relationship: a continuous one that represents the diffusive risk during the trading period and a discontinuous one that captures random overnight price changes. The distinct premia for trading and non-trading risks expand Merton's intertemporal asset pricing model published in 1973. The results show that both trading risk and the risk of overnight price changes play a crucial role in understanding expected market risk premium. Wagner also showed that the risk premium differs significantly in the two periods. One of the main messages of the presentation was that exchange closures are usually accompanied by an increase in investors' risk aversion, who therefore demand a higher premium for holding the portfolio overnight.

The parallel sessions during the afternoon concentrated on the bond market and theoretical and social innovation. The latter session's first presentation was delivered by *Alexander Szimayer*, professor of finance at the University of Hamburg. He presented the results of his research conducted with three members of the Department of Finance of the CUB, Péter Csóka, Zsolt Bihary and Péter Kerényi, examining managerial power and demanded pay in a principal-agent framework. The audience learnt about a continuous model with two non-standard features: 1) the agent can restrict the principal's strategies, 2) agents determine their demanded future pay based on realised past pay, also addressing pay for luck. They also take it into account that shareholders (the principals) restrict demanded pay at the expense of agents, in line with the so-called say-on-pay, i.e. shareholders' vote on the remuneration of the firm's executives. The framework can be used to examine the impact of managerial power on executive compensation and the say-on-pay regulations of the 2000s. The results show that say-on-pay increases principals' power (value), decreases outrage, in other words it acts as a natural

barrier to the excessive increase in compensation, thereby lowering agents' pay when high pay is demanded. By contrast, in the case of low or medium demanded pay, say-on-pay slightly increases overall pay, while the structure changes and shifts towards incentive-dependent salary components.

The evening plenary session began with the presentation of *Balázs Szentes*, professor at the London School of Economics and editor of several top economic journals. Szentes, an expert in game theory and contract theory, gave a talk about the learning process before trading and the reduced efficiency arising from disregarding "free" information. In his bilateral trading model, the seller makes a take-it-or-leave-it offer, however, the buyer is uncertain about the value of the product but may access additional information for a premium, and this cost increases in line with informativeness. Assuming a free learning opportunity, the model's equilibria can be Pareto-ranked. The presenter pointed out that if learning is costly, but the cost of information converges to zero, then the system converges to the worst free-learning equilibrium.

The first day of the conference concluded with the presentation of *Rafael Schiozer*, the head of the Accounting and Finance Department of the Brazilian National Research Council. In his talk, the financial stability and banking system expert concentrated on the practical experience about forbearance of bank loans. The main question was why and when, under what financial difficulties is existing credit debt renegotiated. The conclusions were drawn based on a database containing 13 million loans disbursed to non-financial corporations in Brazil, 1.1 million of which were forborne. Evidence suggests that larger loan amounts and the difficulty in seizing collateral increase the probability of forbearance. Borrowers' previous renegotiations also raise this probability and they may also indicate loan evergreening. In the case of the overwhelming majority (80 per cent) of loans, forbearance typically occurs in the four months following a 60-day delinquency. If prevailing regulations state that banks may increase the provisions of non-delinquent loans of borrowers who also have delinquent loans, this incentivises forbearance on non-performing loans. Because of the macroeconomic resource allocation problems arising from this and the concealment of loan losses, these findings point out important lessons for regulation and supervision.

On 15 November, the conference continued with a plenary session. The first presenter was *Jonathan Batten*, a finance professor at the University Utara Malaysia and the managing editor of *Emerging Markets Review* and *Journal of International Financial Markets Institutions and Money*. Batten is a returning speaker at the conference: in earlier years he talked about the feasibility of hedging international stock market indices with Brent oil futures contracts, pointing out that the efficiency of hedging changes over time and depends on the given equity market, but brings economic returns. Now, his presentation was about hedging risks arising from the

price movements of Indonesian and Malaysian stock markets with Brent and palm oil and FX futures contracts. In the Indonesian and Malaysian economy, palm oil producers are micro and small enterprises. Since international palm oil prices are denominated in USD, they are exposed to changes in stock exchange prices as well as the fluctuations in the USD exchange rate, which has a major economic and social impact. Indices measuring the illiquidity of stock markets have shown that the liquidity effect that changes over time correlates with the efficiency of hedging. In financially more advanced and open economies, highly liquid equity markets enable more efficient hedging, so in economically more developed Malaysia hedging with palm oil is more efficient than in Indonesia. In an economy with a “healthy” equilibrium in terms of exports and imports, the foreign exchange risk can be minimised, and the presenter believes that we should focus on hedging the risks arising from the variability of commodities’ trading prices.

The second presenter at the plenary session was *Fabrizio Lillo*, professor at the University of Bologna. He spoke about asset commonality, systemic risk and investment strategies. He analysed the relationship between investment funds and the financial instruments in their portfolios with dynamic, bipartite network representation. Investment funds build their portfolio from various financial instruments, and there are highly popular assets (e.g. stocks of large enterprises) and very unpopular ones. Lillo measured commonality with the so-called Average Commonality Coefficient (ACC) reflecting the investment behaviour of asset managers as a function of the popularity of the assets they hold. The indicator distinguishes between investment funds based on which of them invest in less popular assets on the one hand and provides information about fund performance on the other hand. The main conclusion of the analysis covering the 2003–2011 period was that the investment funds that invested in less popular assets outperformed the others. This is because investments in niche markets are less affected by fire sales in times of financial market turmoil.

After this, the daily programme continued with the presentations in parallel sessions. Experts talked about theoretical and practical aspects of liquidity, investment funds, central counterparties and the banking system as well as social innovations.

The application for the next conference to be held on 26–27 November 2020 is now open (https://www.uni-corvinus.hu/fooldal/egyetemunkrol/tanszekek/befektetesek-es-vallalati-penzugy-tanszek/tanszeki-kutatasok/#null_33).

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Manuscripts should be submitted in accordance with the following rules.

- The length of the manuscripts should be limited to 40,000 characters (including spaces) but a \pm 25–50 per cent deviation is accepted. Manuscripts should be written in Hungarian and/or English.
- The unnumbered footnote of the author's name contains his/her position, the institution the author works at, his/her email address and any other relevant information and acknowledgment regarding the article.
- Papers always begin with an abstract which should not exceed 800–1,000 characters. In the abstract a brief summary is to be given in which the main hypotheses and points are highlighted.
- Journal of Economic Literature (JEL) classification numbers and keywords should be given.
- Manuscripts should be written in clear, concise and grammatically correct Hungarian and/or English. Chapters and subchapters should be bold.
- Manuscripts should contain the list of references with the first and surname of the authors (in case of non-Hungarians the initials of the first name are required), the year of publication, the exact title of the book, the publisher, the place of publication. In case of papers, the exact title of the journal, the year, the volume, and the pages should be indicated. References in the text should contain the surname and the year separated by comma. When citing, the exact page be indicated.
- Tables and figures are to be numbered continuously (chapters and subchapters should not contain restarted numbering). Every table and figure should have a title and the units of quantitative values are to be indicated. Tables must be edited in Word, while figures must be edited in Excel. Notes and sources are to be put directly at the bottom of the tables, figures.
- Equations should be aligned to the right and should be numbered continuously in parenthesis. (Chapters and subchapters should not contain restarted numbering.)
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Thank you!

The Editorial Office of the Financial and Economic Review
H-1054 Budapest, Szabadság tér 9.
Phone: +36-1-428-2600
E-mail: szemle@hitelintezetiszemle.hu



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